THE MICRO USER

Volume 10
Number 7
September 1992
£1.95

THE COMPLETE SOLUTION FOR ALL ACORN USERS

INSIDE
Essential Archimedes
Packed full of hints and tips

Mega memory
Expand your machine and get more power

Public domain
Select the best from what's on offer

Digital images
Grabbing video frames on a low-cost budget

Sounds Essential
Making music easy on your 32 bit Acorn Micro

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BBC A3000 • Archimedes • BBC Micro • Master series

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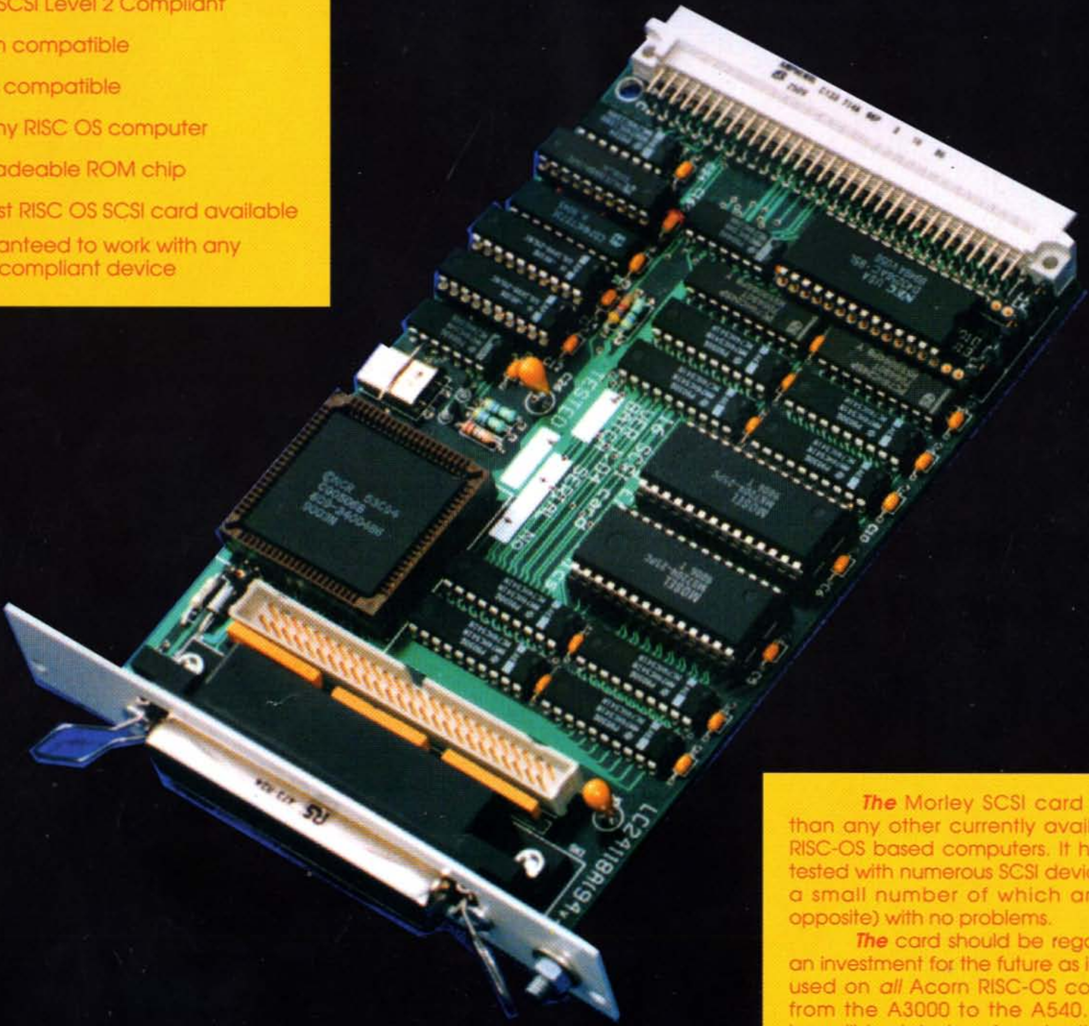

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Grand Opening of Watford Electronics New Headquarters in Luton

*To Celebrate the occasion Watford Electronics and Acorn Computers will be holding an Open Day on **Sunday, the 6th September 1992 from 10.00am to 5.00pm***

Watford Electronics

Acorn Computers will be using the event to showcase their new RISC based computer

Also on demonstration, along with the complete range of Acorn Computers will be the A4 Notebook Computer benefiting from the power of an ARM 3 processor and RISC OS 3 operating system. Staff from Acorn will be on hand to answer your questions on the new products and everything Archimedes.

Third party software and hardware companies will be well represented, some of the events and guest companies include:

- Acorn Computers
- Aries PC Computers
- The Micro User Magazine (Joint sponsors)
- BBC Acorn User Magazine (Joint sponsors)
- Sales
- Technical Advice
- Education Specialists
- Finance Available

Watford Electronics' own technical and sales support staff will be avilable to offer advice and assistance on the extensive range of products available through Watford Electronics. Come and see our revolutionary new "village" areas in our showroom; dedicated areas featuring products from the leading manufacturers. Educational seminars will be held in the conference suite and theatre.

Some of the many products on show and available for purchase on the day include:

- Printers
- Hewlett Packard Range
- ARM 3 Upgrades
- Multiscan Monitors
- IDE Hard Drives
- Scanners
- Video Digitisers
- Laser Direct Printers
- Cordless Mouse
- Joysticks
- Archi DTP
- Ultimum

Direction to Jessa House from the M1 Motorway:

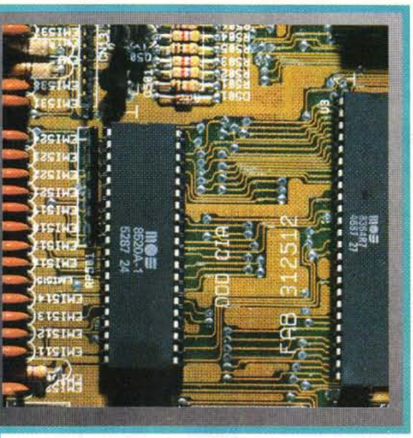
Exit off junction 11 of the M1 – If coming from south, turn right at the roundabout (under the motorway) or from the north, turn immediate left – Across 3 sets of traffic lights – At the roundabout turn right – Pass the "Do-It-All" store on your left – Over a bridge, across another roundabout – You are now into Dallow Road – After half a mile, you will pass Bestways Cash & Carry on your left – Finway is the first turning on the left after Bestways.

Watford Electronics

Jessa House, Finway (Off Dallow Road), Luton, Beds. LU1 1TR
Tel: (0582) 487777 Fax: 0582 488588

A drop of the hard stuff

In this last issue of *The Micro User* we've taken a look at a wide selection of upgrades and add-ons you can get for your 32-bit micro. Read our findings on Page 33.



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★ This symbol indicates that the feature contains at least one full length listing for you to key in on your micro. All programs for your machine are on the subscribers disc.

Get it right All the major listings in this magazine are accompanied by checksums to help you key them in correctly.

For full details of how to use them see the article on Page 86 of the February 1992 issue

THE MICRO USER
THE MICRO USER

September subscription disc

This month's discs are chock full of goodies from the program listings in this issue and from the Public Domain world. The 8-bit BBC Micro disc is crammed with some superb PD software with the Archimedes disc featuring:

- A demo version of Rhapsody 2
- A brand new version of the amazing ArcFS archive reader
- !!Letter, !Basic Edit

... and much much more.

If you'd like to know more about how to get your very own disc FREE each month, turn to Page 93.

THE MICRO USER

is changing its name to

Acorn COMPUTING

– see Page 11

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4 Mation

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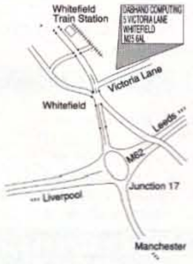

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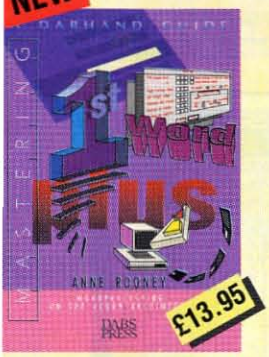

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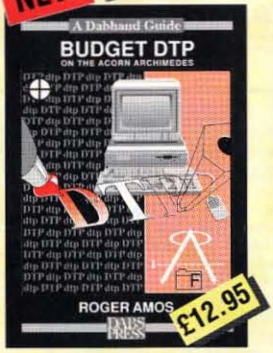

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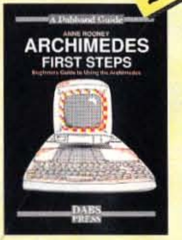

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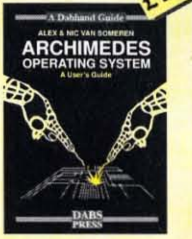

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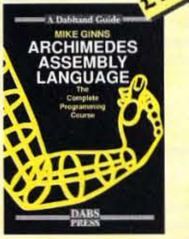

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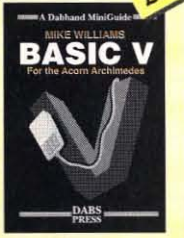

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Full instruction for using the 512 and DOS Plus, with tips on software compatibility. £9.95 or £14.95 with disc

Master 512 Technical Guide
The companion guide with full 512 programming information and hardware expansion projects. Price £14.95 or £19.95 with disc.

Master 512 Shareware Collections
Two collections of PC shareware, all tried and tested on the 512. Includes WP's, spreadsheets, databases, games etc. Five full 800k discs in each. Each collection normally £29.95, special offer £25 for both.

ARCHIMEDES SOFTWARE

Instigator
Utility system providing disc sector editor, memory editor, disassembler, command line archiving, and much more. Price £49.95

Arc PC Emulator Shareware
Similar to Master 512 Shareware but for the Arc PC Emulator. Two collections of five discs each. Normal Price £34.95. Now on special offer, both collections for £25.

ARCDFS
Very popular program to provide full DFS facilities on desktop or !65Host/!65Tube. *(Not A5000 compatible).* Price £29.95

ARCHIMEDES/BBC BOOKS

Basic V Guide
BASIC V guide covering differences between earlier BBC BASICs and the superior version for the Archimedes. £9.95

C: A Dabhand Guide
Massive 512-page complete guide to C programming. No previous experience required. Arc & BBC sections £14.95 or £21.95 with disc.

OTHER BOOKS

Z88: A Dabhand Guide
Introduction to the Z88, by the designers of the machines own software. £14.95

Z88 Pipedream Guide
John Allen's detailed work on all aspects of Z88 PipeDream. Good explanations of printing. Price £14.95

Psion LZ OPL Guide
Ian Sinclair's guide to OPL programming on the LZ series of Organiser machines. £12.95

Games Action from Alien Images

STARCH
Archimedes Action Game

£14.95

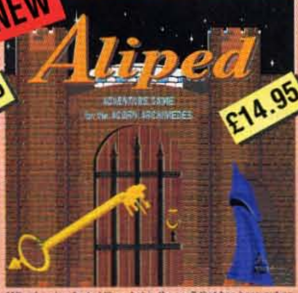
"Harry and Dave manage the laundry firm, but things have been going wrong. They work all night but will they put things right?" Multi level game, high quality graphics, simple key controls for easy movement of characters. Needs 1MB. RISC OS compatible.

"a great deal of fun" *"fiercely competitive"*

"to the accompaniment of decent music, effects and humourous speech"

Duncan Evans - ARCHIMEDES WORLD

NEW



£14.95

"Aliped - wing footed like a bat is the spell that has been put on you by the evil step-mother of your fair princess Natasha". Smooth multi-directional scrolling castle, stunning use of stereo sound, high quality graphics. Needs 1MB. RISC OS compatible.

"Aliped is a sideways scrolling arcade adventure starring you as the bat-winged, red caped crusader."

"Decent looking game" *"Worth investigating"*

Duncan Evans - ARCHIMEDES WORLD

COLONY RESCUE
A SPACE ADVENTURE
on the Acorn Archimedes

£14.95

The date is 2143 A.D., the universe has started to contract, causing the most inner galaxies' fine balance to be upset. Their only chance is you in your humble rescue ship. Multi level game with high quality graphics. Needs 1MB. RISC OS compatible.

MORE ARC GAMES

ALERION
Classic shoot-'em-up scroller. Multi-level, RISC OS compatible. Not protected. £14.95.

ARCENDIUM Draughts, Backgammon, Reversi and Quadline, now RISC OS compatible. £14.95

ALIEN INVASION Classic Space invaders with editable invaders, waves etc. £14.95

ALL-IN BOXING Realistic boxing game with digitised sound etc. 1 or 2 player. £14.95.

To Dabs Press, FREEPOST (MR8400)
Prestwich, Manchester M25 6LZ (Phone 061-773 8632)

Please send me: ____________________

Amount £ ____________ Cheque/POenclosed.

Access/Visa No. ____________________

Name ____________________

Address ____________________

The start of a new era!

Radical changes are taking place in the Acorn marketplace. Spurred on by dramatic announcements from Acorn itself, a new wave of enthusiasm is seeping through the computing community.

And prominent among the developments is a completely new look for your favourite Acorn magazine.

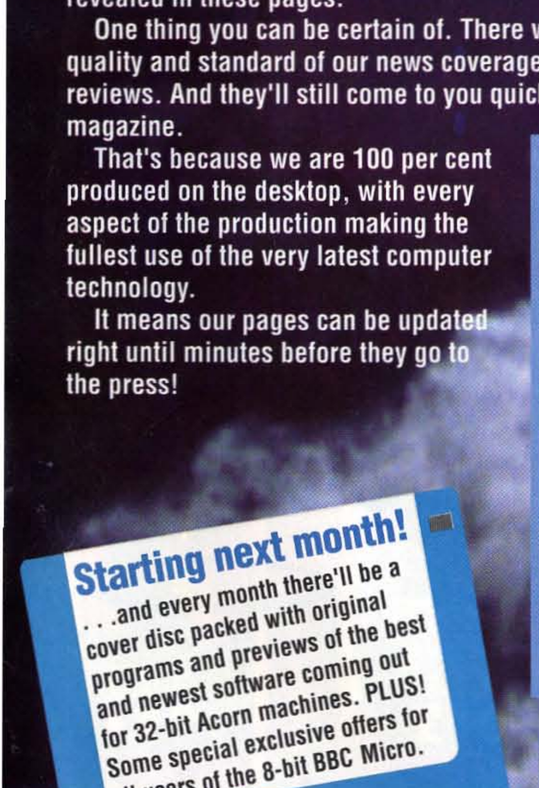
Starting life ten years ago as BBC Micro User, later becoming The Micro User, it has been in the forefront of Acorn computing, priding itself on being the first to bring readers the news of every milestone in Acorn's history.

And there are many surprises still to come – all to be duly revealed in these pages.

One thing you can be certain of. There will be no change in the quality and standard of our news coverage and our incisive reviews. And they'll still come to you quicker than with any other magazine.

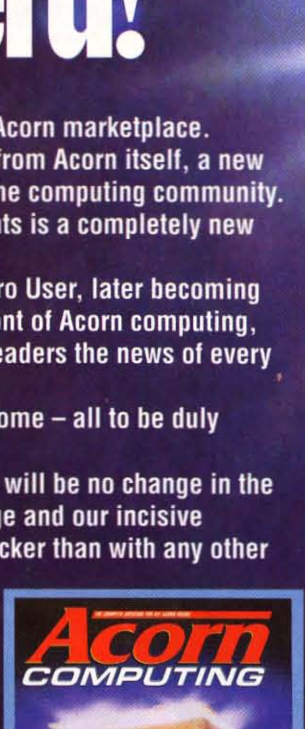
That's because we are 100 per cent produced on the desktop, with every aspect of the production making the fullest use of the very latest computer technology.

It means our pages can be updated right until minutes before they go to the press!



Starting next month!

. . .and every month there'll be a cover disc packed with original programs and previews of the best and newest software coming out for 32-bit Acorn machines. PLUS! Some special exclusive offers for all users of the 8-bit BBC Micro.



Watch out for a *SENSATIONAL* announcement on next month's cover

It is one of Britain's longest-running and most successful computer magazines

THE MICRO USER

Now, to reflect the growing importance of Acorn machines, it changes its name to...

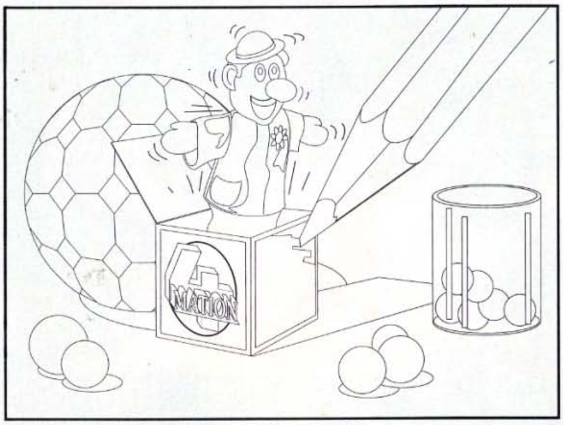
Acorn COMPUTING

Don't miss your old friend in a new coat –

ON SALE September 17

While the emphasis in the new Acorn Computing will be on Acorn's 32-bit range, we will still be fully covering the original BBC Micro. Shortly we'll be giving details of a scheme designed to put new life into this durable micro – watch this space!

See your newsagent NOW – or fill in the subscription form on Page 93 ➤



Original Draw file

Chameleon

the easy-to-use Draw file colour editor

"extremely easy to operate"
"an essential purchase for those who wish to produce more colourful and realistic images"

Rob Miller BBC Acorn User May 1992

◆ FREE DEMO DISC

See for yourself. Send us a blank disc and ask for a demo copy of Chameleon (complete apart from the save and print facilities).

◆ FREE SITE LICENCE + P&P

included in the price of £37.50 + VAT ($NZ 150 incl GST)

4Mation 14 Castle Park Road Barnstaple Devon EX32 8PA
Tel (0271) 25353 Fax (0271) 22974

4Mation NZ PO Box 12-228 Christchurch
Fax (03) 655-055

NZ price subject to exchange rate fluctuation

Chameleon allows you to:

- Edit colours without ungrouping objects
- Change line colours
- Change fill colours
- Fill outlines (objects with no fill colour)
- Outline objects (objects with no line colour)
- Use 4 different styles of fountain fill for graduated shades
- Choose colours from extended palettes
- Perform both local and global changes
- Undo and Redo colour changes
- Save highly-compressed files (compatible with Vector)
- Save spot colours or CMYK separations (with crop marks)
- Print Draw files of any size (with or without trim marks)

Draw file coloured using Chameleon

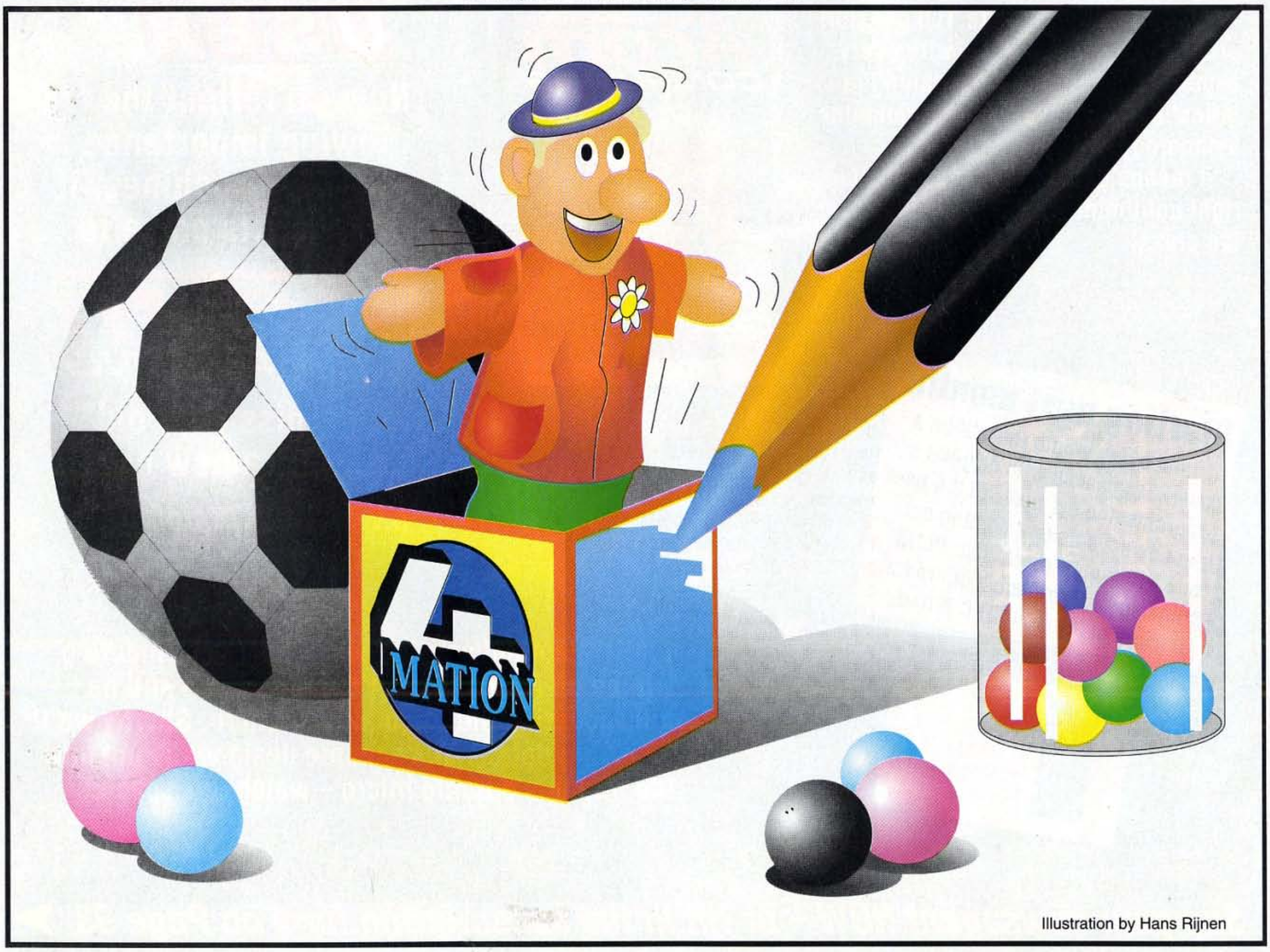


Illustration by Hans Rijnen

Tracking the A4

FOR anyone out there who was disappointed that the portable Archimedes – the A4 – came with a mouse as standard rather than with a trackerball option, PEP Associates (0223 212251) have a solution. Logitech – the designers of the Archimedes mouse – have developed a trackball for the PC market called the TrackMan Portable and PEP are now distributing this in the Acorn arena.

This trackball is quite novel being small and lightweight and clips on to the side of the Acorn A4 offering comfortable and efficient three button placement with a small thumb-controlled ball to move your pointer.

The TrackMan Portable is been designed so that it can be used whether you're left or right-handed and comes with driver software and a small adapter cable which plugs into the serial port and the mouse port on the A4.

The software allows you to specify in which of three orientations the mouse is being used and which buttons correspond to Select, Menu and Adjust.

Three products are available from PEP. The full package costs £95 and consists of the TrackMan Portable mouse, a carrying case, a 9 to 25-pin serial adapter, a 9 to 6-pin PS/2 adapter, a clip attachment device, a five foot cable extension, PC software and manuals as well as the software, manual and adapter for the A4.

If you can't see yourself using the PC options then for £45 you can just buy the TrackMan, clip attachment and A4 software, manual and adapter.

On the other hand if you've already got a TrackMan Portable then £19 will buy you the software, manual and adapter to use it on the A4.

Acorn Open Days

ACORN are launching their autumn season of Open Days with a two-day spectacular and keeping on the pressure right up to Christmas.

These exhibitions are open to everyone and take place all over the country usually supported by and promoted through local dealers. For further information contact Acorn on 0223 245200.

This is also your chance to meet The Micro User editorial team who will be at the shows highlighted below:

Area	Dates	Place
Birmingham	Sat/Sun 12/13 Sept	National Motorcycle Museum
Portsmouth	Sat 19 Sept	TBA
Colchester	Sun 20 Sept	Moat House Hotel, Copdock
Blackpool	Sat 26 Sept	Savoy Hotel
Oldham	Sun 27 Sept	Smokeys Park
Bolton	Sat 3 Oct	Last Drop Village
Sheffield	Sun 4 Oct	Moat House
Jersey	Fri/Sat 9/10 Oct	TBA
St Helens	Sat 10 Oct	TBA
Rotherham	Sun 11 Oct	Moat House
Swindon	Sat 24 Oct	TBA
Slough	Sun 25 Oct	TBA
Nottingham	Sat 31 Oct	Moat House
Stoke on Trent	Sun 1 Nov	TBA
York	Sat 7 Nov	TBA
Northampton	Sun 8 Nov	Moat House
Middlesborough	Sat 14 Nov	TBA
Hull	Sun 15 Nov	TBA
Derby	Sat 28 Nov	TBA
London	Sun 29 Nov	Forte Crest, S Mimms
Brighton	Sat 5 Dec	TBA
Gatwick	Sun 6 Dec	TBA
Bradford	Sat 12 Dec	Novotel
Leicester	Sun 13 Dec	TBA

Black Art

MATT Black (0733 315439) are now distributing a wide range of quality clip-art from Canadian-based company Image Club Graphics.

These images were originally created for the Apple Macintosh and IBM PC machines in Illustrator and EPS format. Due to the features inherent in the soon to be released ArtWorks from Computer Concepts it is now relatively simple to port such graphics across to the Archimedes.

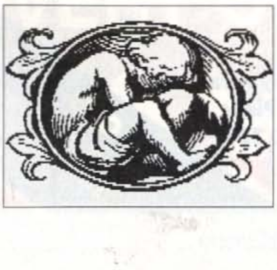
The images have been drawn by artists and the complete library contains 23 volumes on a wide variety of topics from general business to sports and from cartoons and celebrity caricatures to borders for presentations or DTP.

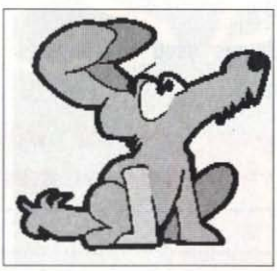
Each volume only costs £29.95 and there is the option to buy a catalogue of the images for £7.95 – £5 of which is refundable against your first order.

Image Club clip-art is composed of draw files which are compatible with any drawing and DTP applications that accept these, including ArtWorks, Vector, Draw, Poster, Chameleon, Impression, Ovation, Genesis and Highlighter.

Matt Black's Matthew Fifield is in the midst of negotiations to port Apple Macintosh Adobe Type I typefaces over to the Risc OS machines which would greatly increase the number of quality typefaces available to Archimedes users.

He is also looking into the possibility of adding a utility which lets you download the Type I faces so that they can be used directly with PostScript printers as easily as on the Apple Macintosh. All being well these should be available at the end of the year.





Don't panic!

ANYONE in the Abingdon area in September should get a towel, a pint and a packet of peanuts and wander over to The Amey Hall Theatre to see a production of *The Hitch-Hiker's Guide to the Galaxy*.

Director Adrian Himpson expects over 2,000 people to attend with all profits being donated to charity. But star of the show is not a paranoid android but an Archimedes connected to a Hi-Fi system and two large screen displays which will perform the complex computer graphics and sounds needed – over 625 frames in total.

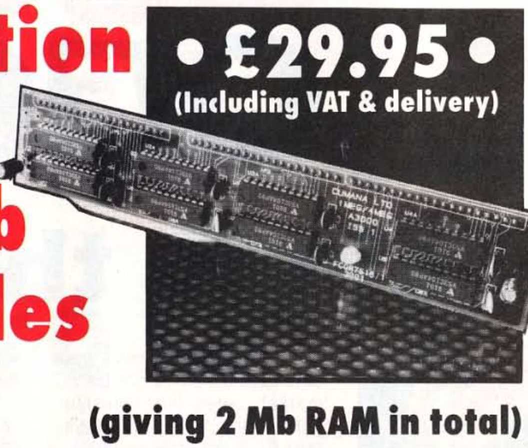
Work on the computer has been going on since February and Adrian and his team have been pleasantly surprised by all the help and support they have received from companies in the Acorn market with both hardware and software – it must be artistically right.

• SPECIAL ANNOUNCEMENT •

Stock Reduction Sale of Cumana 1Mb RAM upgrades for A3000s

• £29.95 •

(Including VAT & delivery)



(giving 2 Mb RAM in total)

Cumana upgrades for the A3000 are the standard by which others are judged. What are the important factors to consider when deciding which memory upgrade is for you?

- Check if the memory board is 2-layer or 4-layer. Acorn recommends 4-layer for all upgrade boards and internal interfaces because it reduces RFI (radio frequency interference). 4-layer boards are much less prone to 'cross talk' between tracks, thereby minimising the chance of data errors.
- Cumana's static control management system increases reliability.
- Fast RAM is always used in Cumana's memory upgrade boards.
- Check if the connectors are low cost, or top-rated as always used by Cumana. Poor quality connectors on upgrade boards are one of the main reasons for erratic performance of the A3000. Don't take the chance.
- Cumana memory upgrade boards are built for exceptionally low power consumption and therefore assist in prolonging the life of your computer.

. . .and then there's the price. . .

Upgrade your A3000 now to that essential 2 Mb - the recommended memory for many applications

NAME .... **ADDRESS** ....

....

.... **POSTCODE** ....

I would like to order ☐ 1 Mb upgrade(s) at £29.95 each.

Please debit my ACCESS /VISA card (please delete):

No. .... **Expiry date of card** ...... / ......

Signature ....

Cheques should be made payable to Cumana Ltd

CUMANA®
The best name in memory

Orders may be placed by: telephone - 0483 503121, or fax - 0483 503326 or sent to: Cumana 1 Mb RAM Offer, Pines Trading Estate, Broad Street, Guildford, Surrey GU3 3BH

• OUR GUARANTEE •
ORDER WITH CONFIDENCE. CUMANA 1 MB RAM UPGRADES CARRY OUR 28 DAY MONEY-BACK GUARANTEE OF SATISFACTION. YOUR STATUTORY RIGHTS REMAIN UNAFFECTED.

Cumana reserve the right to increase the price at any time. Previous RRP £62.28.

This special offer is subject to availability and is only available direct from Cumana

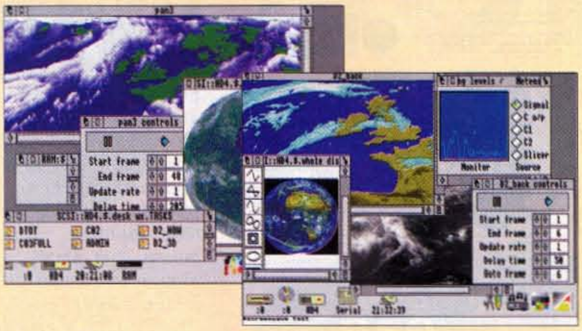
Sunny intervals

DORSET-based Spacetech (0305 822753) have completed The Weather Desk, a multi-tasking weather satellite image gathering system which allows up to six different views of the planet to be collected concurrently. And you can still get on with other tasks on the desktop at the same time.

One example of this would be a full resolution view of Europe as an infra red image, one with the same view in visible light, another view of the whole Earth, one with the latest admin message as well as a window with a zoomed view of the UK with clouds represented in 3D projection.

In addition you can have have many frames of the same view so that you could have a time lapse movie of the changing weather with each sequence updated automatically as the information is downloaded from the satellite.

The Weather Desk needs 2Mb of ram and a hard disc for its advanced image collection and processing. Spacetech have also taken into account the different satellite formats with fully adjustable image sizes.



There are two programmable correlators for picture sync detection as well as automatic signal level calibration and an oscilloscope display of input signal and correlator output as well as a carrier frequency readout.

You can use The Weather Desk with an existing Spacetech Satellite podule and export data directly into PDSView. The package has been built around the principle of ease of use, but for the more intrepid the package is entirely open and an advanced use is documented and encouraged. A complete Meteosat station for an A3000 will cost £989.

Keep it clean

HAVE you looked at your monitor screen recently? If you can just make out the programs from the smears, probably it is time you gave it a clean. This month two separate companies have come up with difference approaches to help you to do this.

Chicopee (0256 469363) are selling a Johnson and Johnson wipe especially designed for cleaning computers and other products which attract high levels of dust.

Duster is a dry cloth which needs no additional cleaners as it is impregnated with a pressure-sensitive pick up agent which removes more dust the harder you press. It is made from a mixture of Viscose rayon and polyester and is non-allergic and silicon-free.

If you're partial to fruit then take a look at Citrawipe from President Trading (081-533 5054). This moist J-cloth is a hard surface cleaner which removes, grime, marker pen, oil and grease as well as smells. It is non-alcohol based and as it is biodegradable it is environmentally friendly.

In the spirit

IRLAM Instruments (0895 811401) have been selected by Acorn to work with them on a major European ESPRIT project called Multiworks.

Acorn have been involved in this programme for over two years and Irlam join them to develop both video and audio compression/decompression hardware for a Risc OS-based low-cost multimedia workstation.

Multiworks has to be able to decompress real-time video and audio from CD-Rom on both Acorn and PC platforms. Irlam have experience in this area having written the first JPEG image compression software for the Archimedes and built Moving-i-Mage – the first real-time windowing video digitiser.

Work is now under way on both audio and video and working prototypes of the hardware will be shown to the European Commission this autumn. Irlam plan to develop the concept for the general market and the first result of this collaboration that Archimedes owners will see is the release of a sophisticated 16-bit audio sampling card.

Making an effect

NEW from Panasonic (0344 853552) is the KX-P4410 laser printer which has a retail price of only £845. An affordable solution for text and graphic production with a low initial outlay, it combines with modular-style easy-to-change consumables and minimal maintenance plus a two-year on-site warranty.

The KX-P4410 includes HP LaserJet II emulations so can be run from the printer driver on Archimedes Applications Discs. It gives an average print speed of five pages per minute with a 300 x 300 dpi output. The standard 0.5Mb ram can be upgraded to 4.5Mb if required.

A new concept

ACORN distributors Hugh Symons (0962 843322) have purchased the Winchester-based Concept Keyboard Company. This is their first venture into the manufacture of computer produce and is part of their strategy to develop as national distributors and vertical market dealers.

Education forms only a part of Hugh Symons' plans for future growth as they are currently evaluating many industrial and commercial applications together with wider opportunities presented by overseas markets.

New wave books

NEW from Emerald Publishing (0223 840138) are DrawBook which lets you print books made up from drawfiles using a single print command, and Technical Documentation on CD-Rom.

DrawBook treats each page as a drawfile and the sequence which makes up a book can be edited, copied or deleted with header and footer text included on each page.

The font for these headers and footers is selected from all the fonts in your System folder. As cheap low-level DTP alternative, you can use Draw to create multiple text columns and embedded text commands as well as include imported sprites. DrawBook costs £15.

The CD-Rom which is due for release this autumn will provide all the important technical documentation for Risc OS machines including Programmers' Reference manuals, DDE, C and Assembler manuals, BBC Basic manuals, Risc OS 2 and 3 User, Style and Application Guides, Midi Guide, I/O Podule Guide and TCP/IP documentation.

The files are the ones the manuals were printed from so what you'll see on screen will be the same as if you have the book in front of you.

But by using the powerful accessing software with its comprehensive search routines, note-taking facility, user-definable bookmarks and the ability to view several pages of the same or different manuals at the same time, this medium is much more flexible.

Top line printing

CALLIGRAPH (0223 461143) are well known for their direct driver laser printers for the Archimedes and their new baby is now available, the Calligraph TQ-1200. This is a 600 x 600dpi laser printer which has an astounding list of features for £4,995 and can be used with any Archimedes although you will need 8Mb of ram.

Test print from the Calligraph TQ-1200 Professional Laser Printer.

Perfect camera-ready copy on all formats up to A3 as well as paper- and polyester plates for fast turn-around short run litho printing.

Calligraph

The TQ-1200 can produce oversize A3 printing with true 600dpi which can be enhanced by software and hardware configuration to give 1200dpi.

The machine is compact measuring 490 x 455 x 210mm and weighing 23kg. But more impressive is its ability to print on to paper and polyester plates used in litho printing. This means that small to medium print shops can produce plates quickly.

The TQ-1200 is based around a Toshiba engine capable of 300 to 1200 dpi printing produced at up to eight pages a minute.

There is a good range of paper feed options which you'd expect with a model of this quality, handling large volumes, unusual formats and heavy materials.

As standard you get an A3 250 cassette and a single sheet feeder for polyester plates and thin card. Or you could opt for a second A3 250 paper bin with the ability to select paper from either feeder as well as switching from one to another on long print runs.

Another option is the 150-sheet straight through multi-purpose stacker for envelopes, transparencies, labels, card and paper printer plates.

Video action

MAGPIE from Longman Logotron (0223 425558) is a multi-media application which can now take full motion video sequences created using Acorn Replay.

You can now add a whole new resource of computer movies without a camera or tape recorder. As with pictures, text and sounds you can include moving images by simply dragging and dropping a Replay film on a page.

In addition Magpie now supports CD Audio too, which means you can play any section or track of an ordinary audio compact disc at the press of a button. This gives everyone the ability to combine sounds and images in imaginative ways. Magpie still only costs £59 and all registered users can simply ring Longman Logotron for their free upgrade.

MAGPIE

Information By Design

What is Magpie?

Linking Pages

MAGPIE
MULTI-MEDIA
JOINTS

What's on

Micros for Special Needs
Oldham, Queen Elizabeth Hall
13-15 October
Contact: NW Semerc (061-627 4469)

Acorn User Show
London, Wembley Exhibition Centre
16-18 October
Contact: Safesell (0737 814713)

Christmas Computer Shopper Show
London, Olympia
19-22 November
Contact: Blenheim (081-742 2828)

BETT '93
London, Olympia
20-23 January
Contact: EMAP (071-404 4844)

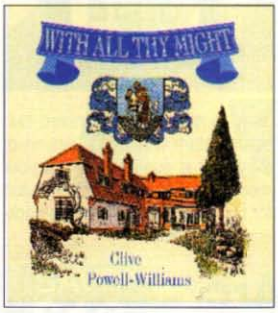
On the tiles

IN the July issue we gave the price of !Tiler from Desktop Projects (061-474 0778) as £10 – please note that this price does not include VAT.

Making history

ST MARTIN'S school in Northwood have recently produced a hardback history of their school, *With All Thy Might*. This was put together on an A5000 using Impression and a LaserDirect Canon LBP-4.

Unfortunately, some of the photographs were in such a bad condition that they needed professional photographic help, but Head of IT Alan Booth was able to use Scanlight Professional to indicate to their printers the exact cropping, scaling and placement of the illustrations.



St Martin's also use the Archimedes system and CC's business supplement in their school marketing. Alan Booth commented: "It would have been far too expensive for us to use anything else. And there simply wouldn't have been a school history without it".

He was able to port the original 100,000 words in First Word Plus format into Impression and edit it down to 75,000 with 100 illustrations of camera-ready artwork in a fortnight in term time as well as teaching a full timetable.

Managing the SCSI

CUMANA (0483 503121) have launched SCSI Manager, a user-friendly management program which lets you partition SCSI hard discs and password protect key sections containing confidential data. You can also apportion read-only or write-only status to each section of the hard disc as a further safeguard.

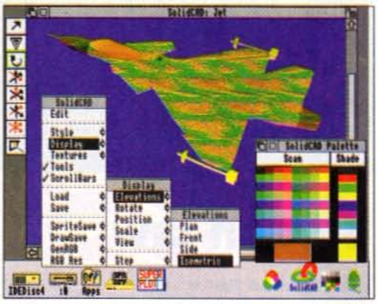
If SCSI Manager is used with Cumana's EasyShare networking firmware you can map each section of the hard disc to a particular machine. Each hard disc can be divided into nine sections.

Full information is given on-screen and is easy to read with an online help option avoiding time-consuming and complex command line programming. SCSI Manager now comes as standard with all Cumana's SCSI/CDFS cards for the Archimedes range.

Silicon's new CAD

SOLIDCAD from Silicon Vision (081-861 2173) is now in its fifth release and is available as an upgrade for £50 to SolidCAD and Realtime Solids Modeller users.

The new features include new documentation as well as a Realtime Graphics Language Module for high-speed programmable animation and 24-bit RGB output for superb quality images on a standard Archimedes display.



Output has also been improved with the addition of SuperPLOT and SuperDUMP drivers for plotters and Epson compatible printers, while the high-speed rendering provides texture mapping and smooth-shading in less that two seconds.

Ten years of Widgits

IN 1993 Widgit Software (0926 885303) will have their 10th anniversary. To celebrate this they are holding a competition open to any and all education establishments in the UK.

First prize will be a cheque for £200 and a Widgit Software voucher, second a cheque for £100 and a voucher, while the third winner will receive a £50 cheque and a purchase voucher.

In addition there will be a prize of £20 which will be awarded directly to a student. The vouchers entitle you to one copy of as many of Widgit's current titles as you want.

The competition is centred around three categories and prizes will be awarded for the best ideas for curriculum use of Widgit Software in symbol and communication, open framework, and early learning.

Full details can be obtained directly from Widgit and there is a closing date of November 30. The prizes will be presented at the BETT '93 show and Widgit also plan to publish a freely copiable book of the best ideas.

The student's prize of £20 will be awarded to the best piece of work produced using From Pictures to Words, Using Symbols or ScreenPlay.

Industry-standard networking

JULY'S AccessIT conference in Nottingham saw Oak Solutions (0274 620423) launch their new high performance networking system for the Archimedes.

ClassNet is a strategy rather than just a system. Networking can begin with ClassRom which makes a single high-speed hard disc looks like two drives – one for applications and one for data.

The former is read-only with the applications drive being read/write. Management of the ClassRom is password protected.

A complete system including SCSI interface and hard disc is available for all machines. If you have an A5000 a small interface board can be added which converts the existing hard disc to a ClassRom which works as well on a stand alone machine as it does in a networked cluster with an optimum ratio on 1:4 but introduces the next stage of the system ClassShare.

ClassShare uses the ClassNet interface to connect computers together. In use ClassShare is the same as ClassRom and you wouldn't know you're connected to other machines as there is no log on to a file server.

As far as you are concerned you simply have high speed access to a local ClassRom.

ClassShare uses standard hardware, SCSI, ADFS hard discs and Ethernet interfaces and cable. You also have the option of expanding ClassShare to a full network using the same technology by simply adding more computers and file server.

ClassNet provides an alternative to Econet or it can run parallel to the ClassNet's Ethernet cabling. ClassNet is easy to install needing only a ClassNet interface – the Ethernet equivalent of an Econet interface.

Machines are connected using standard Ethernet cabling and existing Level 4 file serves can be connected directly with Level 3 and FileStore file servers accessed via a ClassNet/Econet gateway.

ClassNet understands all the existing Econet instructions and the gateway between the two systems automatically translates information between the two systems while all network transactions remain transparent to the users.

Unix machines use NFS and Acorn's AUN allowing Archimedes fitted with ClassNet to communicate with NFS file servers. Oak are also working on gateways to link ClassNet to a variety of other networking systems.

Green issues

EUROPE'S leading manufacture of recycled paper, Olives Papers (061-436 7100), have launched two new ranges of *green* listing paper. Laz-a-lyst is a high quality 100 per cent recycled paper made from reclaimed printed paper and industry waste.

It is guaranteed not to contain any virgin pulp and its colour and texture are on a par with non-recycled paper. For people who want to be seen to be green there is Olives' Concept listing paper. This is made entirely from post-consumer waste which is cleaned and filtered but not de-inked. This gives a white but slightly speckled sheet.

Both products have a smooth finish and are available as music lines or plain in 11x14.5in and 11x9.5in sizes. There are 2,000 60gsm sheets in a box for £9.

Screen law

THE end of the year will see new laws to regulate how computer users run their installations based on European Commission Directives including how people work with screen-based systems.

The National Computing Centre (NCC) have collated the results of an informal survey among their 2,500 member organisations concerning working with display screen equipment.

The comments of the NCC members suggest that the major problem they envisage with this new legislation is interpretation rather than cost.

In particular they criticised vagueness, subjectivity and lack of rigorous specifications or measurements within the draft document.

Links design

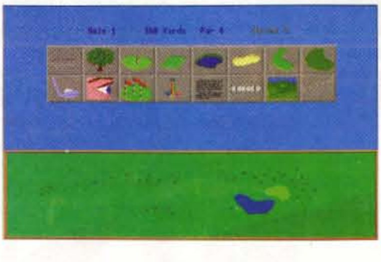
NEW look CIS (071-226 3340) are about to release their first product which will also enhance the successful MicroDrive and MicroDrive International. A golf simulator which is more than a golf arcade game, MicroDrive has been enhanced by its new sister program MicroDrive Designer.

This gives you the ability to create your own 18 hole golf course. Full details, a walk through guide and golfing advice will be part of the comprehensive documentation, but the program has been designed to be allow you to create an accurate simulation.

As well as the designer the finished version will give you sample courses, horizons for those who don't want to create their own and a program to allow you to make your own course discs.

The initial screen gives you a set of icons which lead into sub-programs giving you 48 types of trees to choose from, a range of rivers, ponds and lakes and green sizes which can be flipped and rotated enlarged or reduced to fit with your game plan.

The fairway, rough and out of bounds areas can be finely adjusted and everything is controlled via the mouse. One particularly nice feature is the intelligent flag positioning. You can add dips and hills where you want and view them in a 3D matrix form too. The program will tell you where the flag can be, taking into account the lie of the land.



Add to this the length, the expected par rating as well as the angle and location of the tee and you're ready to start – the program does check to make sure that you have included all the vital elements. For £24.95 you could create a course fit for Nick Faldo.

Used in evidence

PLAYBACK
PLAYBACK

PLAYBACK is a new utility from Risc Developments (0727 40303) which records in real-time all the mouse and keyboard operations as they happen. You can use this package to create demonstrations of programs which run on the desktop.

As you have recorded and saved all the mouse movement and key presses on the replay you can see exactly what happened – the mouse pointer follows all the recorded movements and button clicks and text appears on screen as if it was typed from the keyboard. Even the speed is the same.

You can record up to an hour and your efforts can be converted to text format for editing. It is also relatively easy to add a synchronised text commentary and a PD version of PlayBack is supplied so that your recordings can be freely distributed for play-back only. The whole package costs £19.

State of the Arc

A NEW engineering consultancy, State Machine (0582 484266), dedicated to advancing the capabilities of the Archimedes has been founded by Chris Honey and Justin Fielder who were previously working on projects for Watford Electronics and Computer Concepts.

Their first release is a graphics accelerator card which will tackle the Archimedes existing limitation in the areas of colour palette selection and screen mode size while remaining fully compatible with Risc OS 2 and 3.

This new card reduces video circuit loading on the central Arm processor by up to 50 per cent and displays fully usable 256-colour 800x600 resolution or 16-colour 1,024x768 pixel screen modes on any multisync or SVGA monitor.

Certain high resolution monitors will also be capable of displaying 1,152x852 16-colour or 1,280x1,024 4-colour Archimedes screen modes with a special virtual window mode allowing super large images to be panned and scrolled using an ordinary monitor.

Standard screen modes will also benefit with the more memory hungry Mode 21 screens moving some of their processing to the accelerator card giving much faster speeds.

A 24-bit palette is also provided to increase the number of available colours from just 4,096 to 16.7 million hues. This will give some very high quality 256 grey scale displays and will let Archimedes owners enjoy the graphic capabilities of some of the top-end PCs and Apple Macintoshes.

The card is due for release in September with a price tag of around £250. A professional version is expected soon, which, in addition to the features above, will also have full 24-bit true colour, gamma corrected graphics up to a resolution of 800x600 pixels.

With this card an Archimedes could display photo-realistic quality images and retain the Risc OS desktop compatibility for the first time. The price of the professional card will probably be under £750.

Sounds good

MUSIC lovers will be interested to hear of a new application due to be released in the autumn with the working title of Digital Symphony. The program is being written by the Belgium BASS team – well known in the 32-bit public domain because of a host of useful programs, some of which were reviewed in *The Micro User* last month and featured on the subscription disc.

Symphony is a commercial version of ProTracker which has been enhanced and now includes editing features and is marketed in this country by Oregan Software (021-353 6044) with a provisional price of £50.

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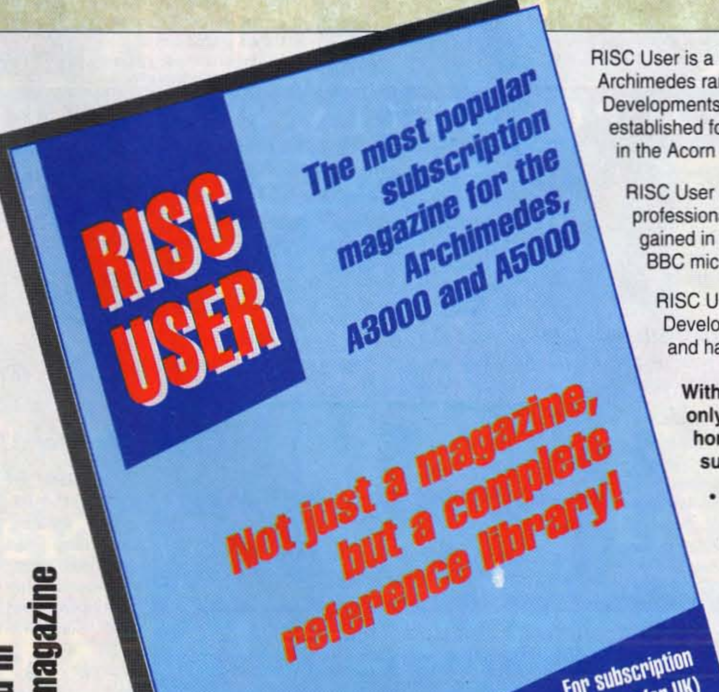

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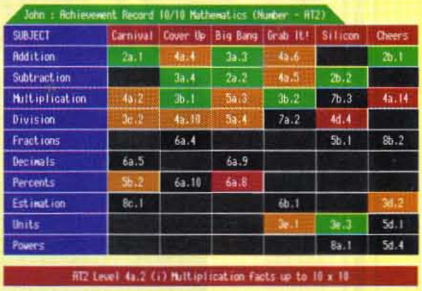
EDUCATIONAL SOFTWARE for JUNIOR to GCSE

A MAJOR NEW DEVELOPMENT

The NEW *10 out of 10* Series

These new suites of programs are a revolutionary step forward in educational software. Their innovative system of automatically recording children's progress truly sets the 10 out of 10 Series in a class of its own.

Each package contains **SIX** expertly designed educational games **covering 10** of the most essential parts of a National Curriculum subject for children of any level or school age **from Junior to GCSE**. As children learn from the games their progress is **automatically recorded** in 36 specific areas of National Curriculum Attainment Targets. The programs are designed to be **fun for single players or groups** and the assessment system monitors the progress of between 1 and 64 children with **no input from parent or teacher** needed. Watch them, join in the fun or leave them and return later to check their progress. **You're in control!**



John : Achievement Record 10/10 Mathematics (Number - AT2)

SUBJECT	Carnival	Cover Up	Big Bang	Grab It!	Silicon	Cheers
Addition	2a.1	4a.4	3a.3	4a.6		2b.1
Subtraction		3a.4	2a.2	4a.5	2b.2	
Multiplication	4a.2	3b.1	5a.3	3b.2	7b.3	4a.14
Division	3c.2	4a.10	5a.4	7a.2	4d.4	
Fractions		6a.4			5b.1	8b.2
Decimals	6a.5		6a.9			
Percents	5b.2	6a.10	6a.8			
Estimation	8c.1			6b.1		3d.2
Units				3e.1	3e.3	5d.1
Powers					8a.1	5d.4

AT2 Level 4a.2 (i) Multiplication facts up to 10 x 10

*The achievement record shows the subjects covered together with the child's progress: Red: Help needed, Yellow: Practice needed, Green: **10 out of 10**!*

10 out of 10

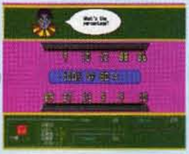
MATHS (Number)

The Mathematics National Curriculum is split into five Attainment Targets. The Maths (Number) ***10 out of 10*** suite of programs is aimed to cover some essential parts of the Levels set out in Attainment Target 2. The package covers many topics from all Key Stages but the ten specific areas built into the design are listed below:

- ✓ **Addition**
- ✓ **Subtraction**
- ✓ **Multiplication**
- ✓ **Division**
- ✓ **Fractions**
- ✓ **Decimals**
- ✓ **Percentages**
- ✓ **Estimation**
- ✓ **Units**
- ✓ **Powers**

Carnival

Here's a great shoot-'em-up that checks number skills along with fire power. The speed of the numbers can be increased to challenge even arcade experts.



Grab It

Find and grab answers quickly as they jump around the screen in this fast-action game. It's a great way to practice number skills from tables to estimation.

Cover Up

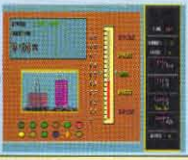
This challenging game of matching really gets children thinking. It's a real game of strategy – especially in the multi-player modes.

Silicon Brain

This game makes calculator practice compelling fun. Key presses are displayed on-screen to let you look back when answers are incorrect.

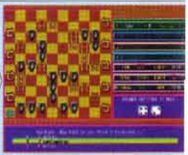
The Big Bang

Keep cool and answer quick is the aim of this game. Quick responses are needed for high scores – an exercise in scale reading as well as arithmetic.

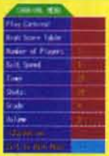


Cheers

Strategy is needed in this unique quiz game. It will keep everyone on their toes. Use any of the six graded sets of questions or compile your own.

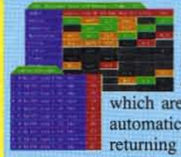


FULL MARKS FOR TOP OF THE CLASS SOFTWARE



Extensive in-game Options

Not only can the educational level of the games be chosen, speed of play, game length and many other options can be set to tailor the programs to your child's skill level at the game. This means the games can be set to suit anyone from novice to arcade expert – it keeps interest longer and increases personal challenge.



Dual Scoring System

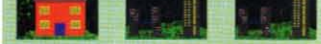
High percentages change the colours of the achievement chart while good gameplay – combined with high marks – give scores which are recorded on the high score tables. Both are automatically saved on disc so that children can keep returning to the package to improve on previous results.

Certificate Printing

Children with high marks can print a certificate of achievement. Text or graphic options are given to suit any printer and *Triple R Education* will print you a special one for a nominal charge.

Three Sets of Graphics

All the games have three sets of graphics to appeal to any age. These are automatically selected depending on grade – a parent/teacher override is provided so that you can select the pictures most suited to your child.



Unparalleled Quality and Attention to Detail

This package is the result of months of work by experienced programmers, educational designers, game designers, teachers, parents and children.

Mathematics – Number
Parent/Teacher Guide
Player Guide

Two Guides

The player guide lets learning start quickly while the parent/teacher guide gives more details – including how to interpret the Attainment Target numbers.

Parent/Teacher Flexibility

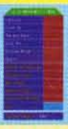
Many of the automatic features of ***10 out of 10*** can be customised by parents or teachers – including sound off/on, the starting grade and the graphics to be used. A *Reveal* option lets you see the educational objective of the game being played at a glance. There's even an optional code system to prevent children altering stored information.

Ideal for ALL Ages: Junior to GCSE

The fully flexible games cater for simple addition, subtraction and tables at easier levels but develop to more advanced topics. Adults will find the higher levels a challenge too!

SIX Top Games

The games are designed with education of paramount importance but the fun and challenge elements ensure that children will want to strive for better results each time.



Designed for the National Curriculum with Traditional Educational Values in Mind

While ensuring that items like tables are well covered the package deals with many important subjects in the order recommended in the National Curriculum.

10 out of 10 Maths (Number) is available NOW for only £25.95 – but you can try it FREE!

You can order by post or phone with cheque, credit card details or Education Authority order. We will not process your order for payment for 14 days from the dispatch of the product by first class mail. **If you return it within that time we will not debit your credit card or we will return your original cheque or order.** This offer is available on all orders received from this advert. But Hurry – it is for a limited period only.

The *10 out of 10* Series is produced by *Triple R Education*. COMING SOON: *10 out of 10* ENGLISH. Ring for details

ORDER by mail or telephone: Access and Visa accepted. *Triple R Education, 1 Percy Street, Sheffield, S3 8AU, England.* 0742 780370

For all 32-bit Acorn home computers

Brilliant special needs

THE Micros for Special Needs Exhibition in Oldham in October will see Brilliant Computing (0274 497617) giving pride of place to a new range of Archimedes programs. Featuring graphics and sound, the programs use the Archimedes capabilities to motivate the special needs user.

At present Brilliant Computing partners Rod Boyes and Nick Pronger are prototyping software to develop speaking and listening skills. In addition they have been in consultation with Road Safety Departments about a range of games.

By using the stereo capability of the Archimedes they plan to help children look towards the source of sounds when crossing the road and to decide whether they are coming towards them or going away.

Not to be left out TFH (0299 827820) will also be exhibiting some of their 700 products for all ages including computer software and hardware. At present TFH are currently designing a multi-sensory environment which will be the largest in the world as well as the most advanced in technology and application.

Pen power

NEW from Longman Logotron (0223 425558) is PenDown Plus. Heralded as the complete writing solution, it offers easy-to-use wordprocessing, flexible table editing and comprehensive address database management.

PenDown is the top selling wordprocessor for schools, with well over 20,000 users. The new version adds a new dictionary with over 65,000 words, plus a check-as-you-type facility, and a font finding and replacing option where, for instance, you could automatically replace all the occurrences of Corpus Medium 10 point with Homerton Bold 12 point text.

A new table editing section called !Table has been introduced which you can use to create tables. These can then be formatted, simply reorganised or you could calculate column and row sums and percentages with the results incorporated in the wordprocessor.

In addition to !Table is !Mail which is a mail-merging application with which you can create your own databases, search, sort and select as well as import and export data. A host of other improvements and additions are package together for £79.

CD-Rom prices slashed

THE multiple CXX436 six-pack CD-Rom drive from Cumana (0483 503121) has been cut in price from £1,995 to £1,495. The system is designed for use on a network where several users need to access a single or multiple CD-Rom application.

Acorn have joined Cumana to offer existing A3000 education users a complete CD-Rom upgrade for £599 which normally sells to education at £903. This is designed to help schools take advantage of the CD-Rom initiative fundings announced by the Department of Education.

A selection of six CD-Roms completes the upgrade offer with the Dictionary of the Living World, Revelation 2, Hutchinson's Encyclopedia, Illustrated Shakespeare and Sherlock Holmes as well as a copy of the Illustrated Holy Bible.

The hardware package comprises a Cumana CAA 532 CD-Rom, SCSI interface, mains powered stereo speakers, three CD caddies and a mouse mat. This is enhanced by the SCSI Manager, a diagnostics program called SCSI Diag and a CD-Rom telephone support line.

● The CD-Rom education pack

● Stack 'em high with the six CD-Rom player

It's alive and kicking on CD-Rom

THE Dictionary of the Living World is now available from Optech (0252 714340), on CD-Rom for the Archimedes priced at £175. Programmed on the Archimedes by Media Design Interactive it uses sound, text and motion to tell its story.

There are 36 minutes of video using Acorn's Replay system, a full dictionary of biological terms, details on over 5,000 species with photos, video clips and sounds of the animals in the wild as well as distribution maps and of course it is fully multi-tasking.

Another five CD-Roms are due between now and Christmas. The first will be Grooves – a collection of clip-audio which can be accessed on music CD or through the Archimedes which will let you design a play list in background mode in a multi-tasking environment. The sound effects and music pieces in a range of styles can be exported to Genesis or into demos and presentations.

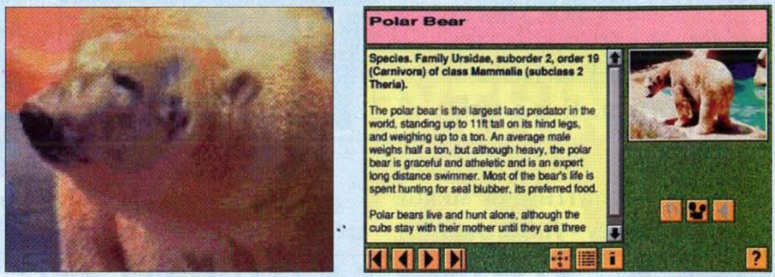
The Image Warehouse will be next with a selection of full colour clip-art in sprite format. Some of the artwork will be 1200x800 pixels in size and the sprites will be divided into four directories. There's Mode 28 and Mode 15, with the other two containing small versions of the same pictures. These will fit on screen and can be used for backgrounds or sections grabbed for further work via ChangeFSI or the carousel utilities.

The final three releases all return to the wildlife theme. Creepy Crawlies, as the name implies, will cover snakes, spiders and the like. There are a total of 71 entries each with a full motion video 30 second clip, a large picture, text and narration as well as a family tree and classification. There is a total of 41 minutes of extremely high quality video.

One particularly nice feature is the ability to access the database in French or English. The language level will also change depending on the age of the reader.

At present you can choose between 7 or 14-year-old standard though Media Design plan to add more age ranges and a wider selection of languages.

Cute and Cuddlies will be in a similar format but will feature such animals as the koala bear. Dinosaurs are always popular and the Dinosaur CD will be the last release this year.



Polar Bear

Species. Family Ursidae, suborder 2, order 19 (Carnivora) of class Mammalia (subclass 2 Theria).

The polar bear is the largest land predator in the world, standing up to 11ft tall on its hind legs, and weighing up to a ton. An average male weighs half a ton, but although heavy, the polar bear is graceful and atheletic and is an expert long distance swimmer. Most of the bear's life is spent hunting for seal blubber, its preferred food.

Polar bears live and hunt alone, although the cubs stay with their mother until they are three

● The living world in text, pictures and video

Acorn Portable Computer

Archive magazine published full technical details of the newly-launched Acorn Portable Computer in its July issue. If you missed out on that by not being a subscriber to our magazine, we would be happy to send you a reprint of the article.

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Home-based learning

Rog Frost sits down with children and parents to look at a suite of mathematical programs

Product: 10 out of 10 (Maths)
Price: £25.99
Supplier: Triple R Education, 1 Percy Street, Sheffield S3 8AU.
Tel: 0742 780370
Requirements: Risc OS

PARENTS are very aware of the needs and rights of their children. And a real bonus is the opportunity to have a program which is tied into the National Curriculum so that parents can know whether their child is fulfilling their potential.

This suite of programs is aimed fairly and squarely at the home market, though it could find a place in schools.

For your money you get a range of six activities. These take the form of games, each of which has a mathematical element. Where appropriate, the games have different grades. These should be seen as ways of practising different skills rather than as levels of difficulty.

Number skills

The skills covered by the whole package are addition, subtraction, multiplication and division, plus percentages, fractions, decimals, estimation, units and powers – a lot of the number skills required by the National Curriculum.

The first game is **Carnival**. A numerical problem appears in the centre of the screen, and above and below it numbers sail past on a conveyor. When you see the right answer, you take aim by moving the mouse then fire.

Levels vary and should allow children of a wide age to use this program. Up to four youngsters can play against each other, each being given the default 10 questions. The speed of the conveyor can be altered from very slow to impossibly fast and you can decide whether to play against the clock or just work at your own speed.

Sound effects are pleasing and appropriate and like all the games, the ending involves an on-screen fireworks display with sound effects and the oohs and ahs of the crowd.

Cover Up is a variant of the old favourite, the pairs game or Pelmanism. Two sets of numbers appear, above and below the line, and they have to be matched. It sounds easy and at the simplest grade it is, but matching a later complex addition sum with possible answers is much harder.

The game can be made more challenging by having more numbers to choose from and the real masochists can have doors that only reveal the numbers for a short time. A good memory is needed as well as the ability to do arithmetic, and the game is entertaining and spans a wide age range.

Next comes **Grab**. A sum is displayed at the bottom of the screen then a set of possible answers appears. The task is to move the hand to the correct answer and grab it. It's essentially simple except that the numbers keep moving with the idea – and it is a good one – of making youngsters adopt the strategy of estimation.

I used a different strategy of just working out the units digit and looking for an answer that matched that. It worked well. Graphics do make a difference in this type of game and F7, F8, F9 pressed while on the main game menu screen changes the graphics and you can choose those more suitable to the age or interest of the next child to play.

Appealing

Cheers is snakes and ladders. The die spin, you answer the question correctly and you can move the counter forwards. Apart from dealing with the questions, you need to think about where you'll end up because you can reject a move which takes you to the top of a long snake. This appealed to children and adults, as a parent or teacher can add their own set of questions.

The **Big Bang** scenario involves preventing a nuclear power station from exploding. Its temperature is kept in check by answering questions fully and is a good exercise in scale reading. A sum appears on screen and you must answer the questions by clicking on the right part of the gauge. Get them wrong and the reactor can get too cold or too hot.

Silicon Brain is the final program and is based around a calculator. The game element involves using it as quickly as possible. A nice touch is that key presses are recorded at the bottom of the screen.

If a youngster gets things wrong and can't understand why, an adult should be able to sort out the problem by looking at this record.

The bonus for parents must be the built-in National Curriculum information. An achievement record is available for each player showing the various parts of the National Curriculum covered by the games.

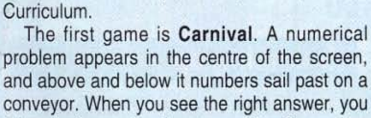
All the numbers – representing the grade and attainment target – start black but as a game is tried – and a certain percentage of questions are answered correctly – they go red, then yellow, green and blue as the score gets to 100 per cent.

Good news for parents is the option – usually only extended to schools – of ordering *10 out of 10* with the proviso that if they don't like it they can return the product within two weeks for a full refund.

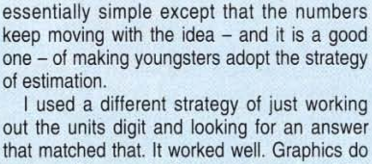
Summing up

Overall this is a useful set of programs. I would rate Carnival and Cover Up highest and these alone make the package worth the money with Cheers and Grab as useful extras. The other two games practise extra skills and were better received by the older children allowing the package to grow with an individual child.

The record keeping – those of a whole class can be kept – and the ability to print certificates are bonuses. 10 out of 10 is unique in home-based programs because of the National Curriculum link and it makes a good resource for parents as well as good educational fun for children.



● There are grave consequences for getting an answer wrong



● Meet Silicon Brain – the calculator with a difference

Product: Le Monde à Moi
Price: £15
Supplier: NW Semerc, Fitton CDC, Rosary Road, Oldham, OL8 2QE.
Tel: 061-627 4469
Requirements: Risc OS

Bienvenu tout le monde

Ian Dickenson pops on his beret to look at a new way of teaching French

THERE may be a lot of controversy over Europe, and politicians may be in a quandary about what to do next, but education is moving forward in its own way. Le Monde à Moi is a small contribution to the overall pattern of events.

A direct development of My World which was reviewed in the June 1992 issue, Le Monde à Moi lets you manipulate graphics screens simply and effectively but with a French flavour.

It is a very friendly and flexible package specifically designed to aid and stimulate the oral use of French and as it is a direct offshoot of My World it is difficult to categorise due to its open-ended nature.

Text and graphics can be combined in any manner depending on your requirements. The program gives all menu selections and options in French with the only exceptions being the more technical terms which are given in English to eliminate any confusion.

In its basic form Le Monde à Moi is a collection of graphic screens on which you can place and move objects. Clicking the Select button picks up an object and you can to take your finger off the button as you drag it, clicking again only to drop it.

This is a useful feature and I wish that more software houses would use it because it is especially useful with younger children or those that find the usual method hard work.

Text can be added to screens, where it too becomes a movable object which can be placed anywhere on screen. Different fonts can be used as can colours and sizes.

Accents on characters are produced by pressing the Alt key at the same time as another key. Make sure that you clicked on the !Accents icon first to access this feature. All movable objects can be deleted if you want.

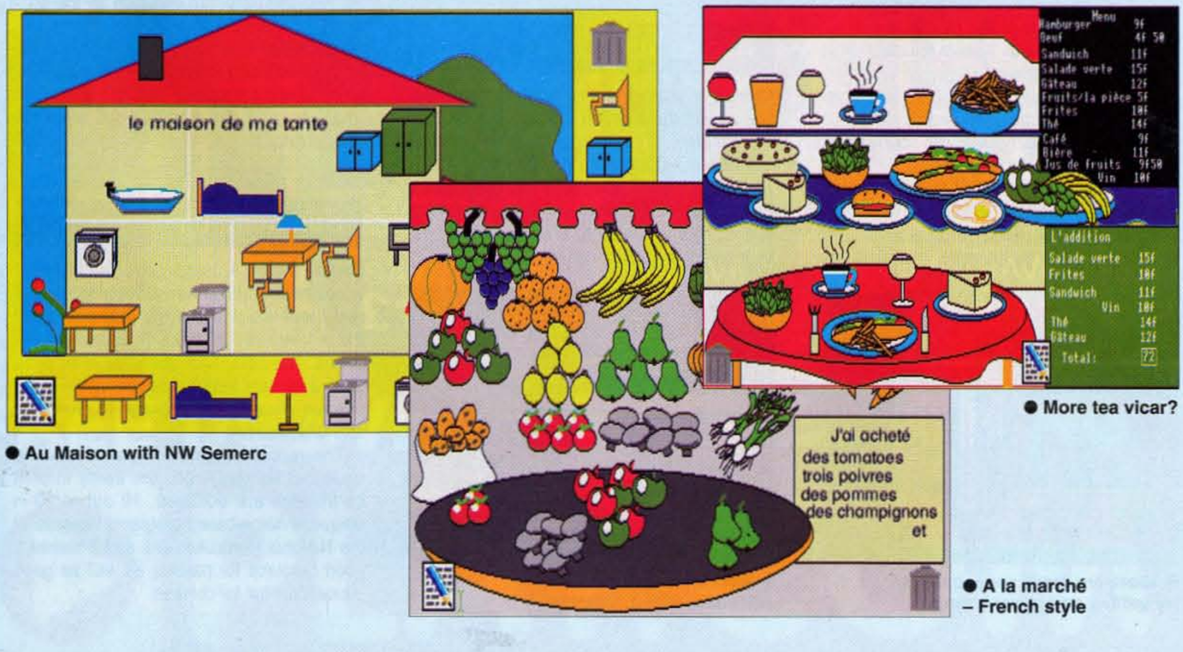
Work can of course be saved to disc and printing can be in either portrait or landscape format and output with the library of all the copiable objects or just the work screen with the placed objects.

The screens provided with Le Monde à Moi are: Cafe, En ville, L'heure, L'ours, Maison, Marché, Visage, Meteo, Alien, Cafetext1, Cafetext2, Les courses and Mots mixtures.

These screens, or ecrans, have been specifically developed by Derbyshire teachers. As with My World, screens can be developed using Draw or you can send your ideas to NW Semerc and they will design them for you.

Summing up

Le Monde à Moi is very easy to use and can be used with a wide variety of ages and abilities. The screens provided give a good selection for use in the classroom or home. Vive Semerc Nord-Ouest!



Menu
Hamburger 9f
Oeuf 4f 50
Sandwich 11f
Salade verte 15f
Gâteau 12f
Fruits/la pièce 5f
Frites 10f
Thé 14f
Café 9f
Bière 11f
Jus de fruits 9f50
Vin 10f

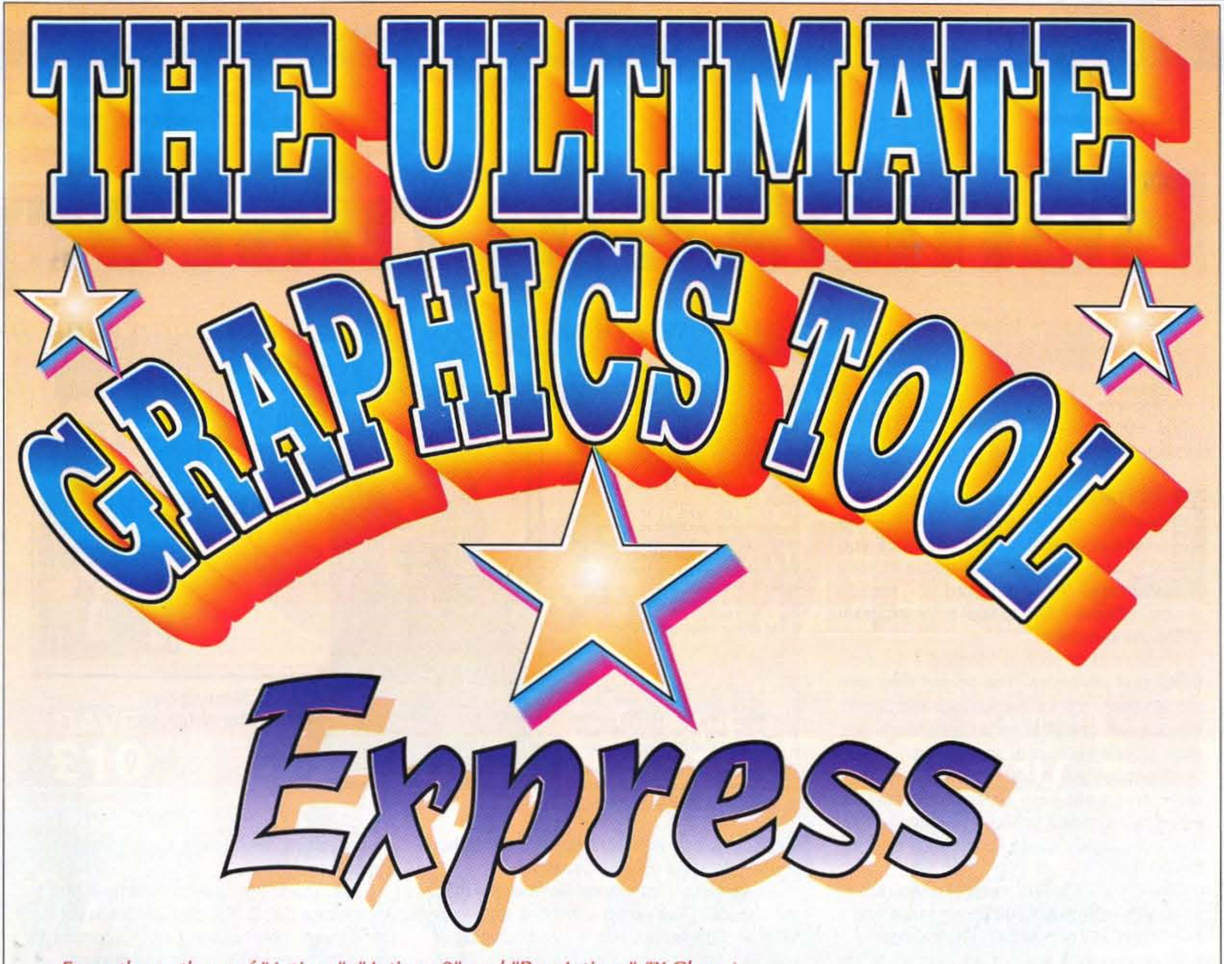
L'addition
Salade verte 15f
Frites 10f
Sandwich 11f
Vin 10f
Thé 14f
Gâteau 12f
Total: 72

J'ai acheté
des tomatoes
trois poivres
des pommes
des champignons
et

● **Au Maison with NW Semerc**

● **More tea vicar?**

● **A la marché – French style**



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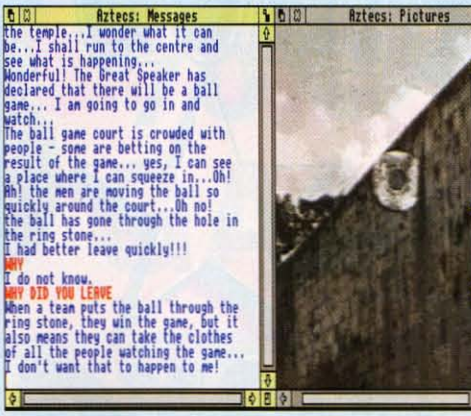
Remaking history

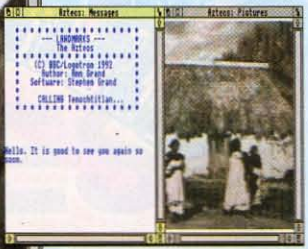
Rog Frost investigates life at sea and on land many

Product: Landmarks – Columbus, Aztecs
Price: £24 each
Supplier: Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS.
Tel: 0223 425558
Requirements: Risc OS



```
the temple...I wonder what it can
be...I shall run to the centre and
see what is happening...
Wonderful! The Great Speaker has
declared that there will be a ball
game... I am going to go in and
watch...
The ball game court is crowded with
people - some are betting on the
result of the game... yes, I can see
a place where I can squeeze in...Oh!
Ah! the men are moving the ball so
quickly around the court...Oh no!
the ball has gone through the hole in
the ring stone...
I had better leave quickly!!!
WHY
I do not know.
WHY DID YOU LEAVE
When a team puts the ball through the
ring stone, they win the game, but it
also means they can take the clothes
of all the people watching the game...
I don't want that to happen to me!
```

● Aztec basketball is strange



```
•••••••••••••••••
•  --- LANDMARKS ---   •
•     The Aztecs       •
•••••••••••••••••
• (C) BBC/Logotron 1992 •
•   Author: Ann Grand   •
• Software: Stephen Grand •
•                      •
•  CALLING Tenochtitlan... •
•••••••••••••••••

Hello. It is good to see you again so
soon.
```

● Starting out in Tenochtitlan

LOGOTRON have been at it again, producing more packages in the Landmarks series. For those of you who have not yet come across these they are linked to – though usable without – the school's TV program of the same name.

The format of each is identical – an illustrated text adventure. The screen runs with two windows, one for the dialogue and one for the pictures. The pictures do not change with each location but appear when relevant.

All pictures are in black and white which is not in itself a bad thing. Unfortunately they are either poor originals or poorly scanned so they only occasionally excite but they do keep up the interest.

The games are very much like text adventures with extremely large vocabularies and a parser that only occasionally lets you down.

However, they are not adventures in the sense that you have to find the treasure and save the dragon, they are really environments to explore. The latest two cover the topics of the Aztecs and Columbus.

So let's take ourselves back in time to the Aztec city of Tenochtitlan. Jade Doll is our guide, a 10 year old girl. Her mother is currently in bed after the birth of a son with Old Golden Flower, the midwife, on hand to help. This means that Jade Doll has a few days to show us around before her mother is up and giving her jobs to do.

One of the first things she does is make a sacrifice by pricking her finger, explaining that this is to feed the gods of the earth.

As we explore the market we meet the market inspector: The parser is working well – say hello and he replies with a good morning. If you ask what he does you're given a good explanation of the duties of an Aztec trading standards officer.

The city is built on various artificial islands, called chinampas, surrounded by a lake. There's plenty more to see with heads on poles, temples, water sellers – the everyday Aztec life. Really the thing to do is stroll around and take it all in.

Jade Doll doesn't quite have the *voice* of some of the other Landmarks characters but she is still fairly real and certainly complains if you make her do too much walking.

This is good as it stops children just rushing about the place and they have to think of more constructive ways to pass the time.

All the Landmarks programs are linked into the computer's real time clock and during the three days of the game, events happen at preset time – in the Aztec program we have a wedding and a ball game.

This can be rather irritating because if the children are not playing at the right time they can miss them. The manuals are a bit vague on what you can do about this so, after a little floundering, the following solution presented itself.

First load the alarm program from Applications disc 2. You can use this to set the clock much more easily than the command line instructions in the Landmarks manual.

The program seems to record the time it started so first you need to set your clock to an earlier time than the first event. In the Aztec program this is at 11am so set the clock for 10am.

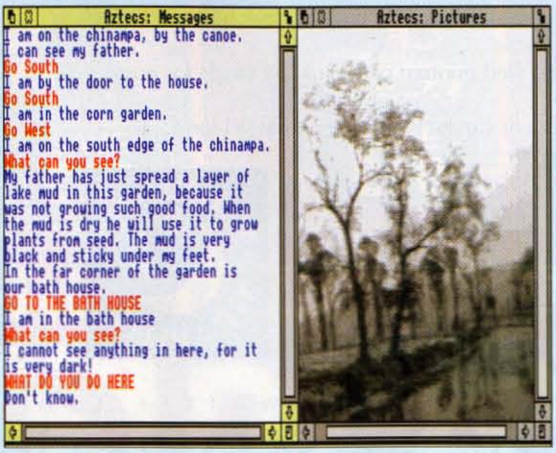
Load the program for a new game and type RESET if it is an old game. Now you can go to the temple precinct, set the clock to 11am and there's the wedding. After that you can go to the ball court and set the clock to 2pm to see the ball game. You have to do this in sequence as you can't move backwards in time.

In the Columbus program we find ourselves on the Santa Maria with Pedro, cabin boy to Captain Colon, on route to the East Indies.

As you're on a ship you need to head to port, starboard, fore and aft. Luckily a plan of the ship is provided for the nautically disadvantaged. One of Pedro's jobs is to turn the sandglass every half hour so you have to get used to him rushing off.

On the first day there's plenty going on aboard ship with speed to be checked, floggings to watch and a leg to be sawn off. If you're feeling sneaky you and Pedro can go to the captain's cabin and read the log and charts. If you're hungry don't go to the hold unless you like maggots.

Over the first night land is sighted and the following day you and Pedro go ashore with the captain. Unlike the other programs the island is not mapped and that turns out to be the main task. Here the program really man-

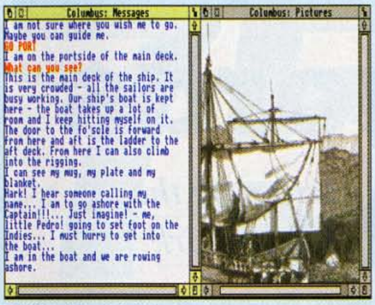


```
I am on the chinampa, by the canoe.
I can see my father.
Go South
I am by the door to the house.
Go South
I am in the corn garden.
Go West
I am on the south edge of the chinampa.
What can you see?
My father has just spread a layer of
lake mud in this garden, because it
was not growing such good food. When
the mud is dry he will use it to grow
plants from seed. The mud is very
black and sticky under my feet.
In the far corner of the garden is
our bath house.
GO TO THE BATH HOUSE
I am in the bath house
What can you see?
I cannot see anything in here, for it
is very dark!
WHAT DO YOU DO HERE
Don't know.
```

● A quiet time on the chinampas

again

years ago



```
Columbus: Messages
I am not sure where you wish me to go.
Maybe you can guide me.
GO PORT
I am on the portside of the main deck.
What can you see?
This is the main deck of the ship. It
is very crowded - all the sailors are
busy working. Our ship's boat is kept
here - the boat takes up a lot of
room and I keep hitting myself on it.
The door to the fo'scle is forward
from here and aft is the ladder to the
aft deck. From here I can also climb
into the rigging.
I can see my mug, my plate and my
blanket.
Hark! I hear someone calling my
name... I am to go ashore with the
Captain!!!... Just imagine! - me,
little Pedro! going to set foot on the
Indies... I must hurry to get into
the boat...
I am in the boat and we are rowing
ashore.
```

● **Life aboard ship**

ages to create and atmosphere of discovery. Mapping skills are therefore developed and the exploration seems very real. This aspect of Columbus really sets it apart from the other programs in the series.

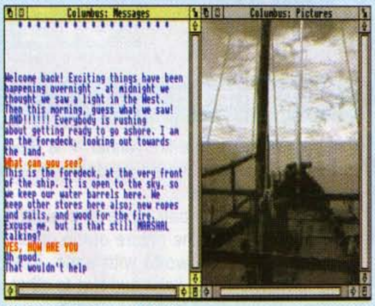
Both packages are very well documented and supported with teachers' and children's materials. This is very important because it stops the explorations of these environments becoming aimless and sterile.

While the notes protest that the aim of the program is not to do the worksheets I can imagine most teachers will make full use of them as the basis for the work.

Summing up

Both programs cover very specific areas of the National Curriculum at junior school level but it is nice to see the continued production of packages that encourage the kind of cross-curricular work that is in danger of disappearing. You could make a lot of either of these.

The only reservation is whether a class can afford the time it might take to get all the children though the activities.



```
Columbus: Messages

Welcome back! Exciting things have been
happening overnight - at midnight we
thought we saw a light in the West.
Then this morning, guess what we saw!
LAND!!!!!! Everybody is rushing
about getting ready to go ashore. I am
on the foredeck, looking out towards
the land.
What can you see?
This is the foredeck, at the very front
of the ship. It is open to the sky, so
we keep our water barrels here. We
keep other stores here also; new ropes
and sails, and wood for the fire.
Excuse me, but is that still MARSHAL
talking?
YES, HOW ARE YOU
Oh good.
That wouldn't help
```

● **On the Santa Maria**

Going for full marks

Marshal Anderson puts a new assessment package through its paces

Product: ArcMark
Price: £57
Supplier: KidsRam, 24 Hawkesbury Road,
Winmalee, NSW 2777 Australia
Tel: 010 047 54 3413
Requirements: Risc OS

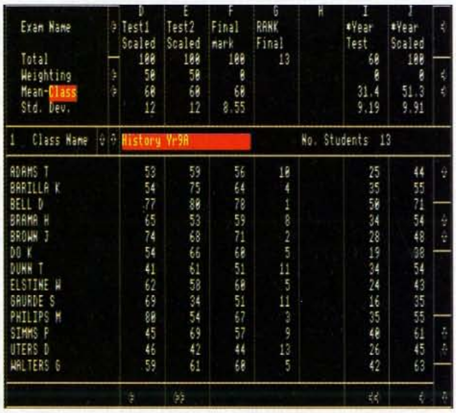
AS if continuous assessment wasn't enough, schools, especially secondary, are being expected to produce more and more in the way of statistical analysis of exam results.

The result is that teachers are finding themselves with huge amounts of data to process – and the computer is a fairly obvious candidate for easing the load.

Enter Arcmark, a computerised mark book from Australian publishers Eureka. There's nothing at all surprising about this package, it is firmly based on the kind of layout you would expect in a mark book with columns for names and marks.

The program uses a rather greedy 900k and can create markbook files of 10 classes with up to 40 students each and 78 sets of marks.

The screen is divided into four. The first gives exam information including a text field for the name of the test, a total mark – the highest mark possible – and an optional weighting.



```
                 D       E       F       G       H       I       J
Exam Name        Test1   Test2   Final   RANK            *Year   *Year
                 Scaled  Scaled  mark    Final           Test    Scaled
Total              100     100     100      13              60     100
Weighting           50      50       0                       0       0
Mean-Class          60      60      60                    31.4    51.3
Std. Dev.           12      12    8.55                    9.19    9.91

1  Class Name    History Yr9A                    No. Students  13

ADAMS T             53      59      56      10              25      44
BARILLA K           54      75      64       4              35      55
BELL D              77      80      78       1              50      71
BRAMA H             65      53      59       8              34      54
BROWN J             74      68      71       2              28      48
DO K                54      66      60       5              19      38
DUNN T              41      61      51      11              34      54
ELSTINE W           62      58      60       5              24      43
GAURDE S            69      34      51      11              16      35
PHILIPS M           80      54      67       3              35      55
SIMMS P             45      69      57       9              40      61
UTERS D             46      42      44      13              26      45
WALTERS G           59      61      60       5              42      63
```

● **The main editing screen**

Four different types of exam can be dealt with using combinations of class or year exams and letter or numerical scores. Mean scores and standard deviations are also displayed. The means can be either for the particular class or, in the case of a year exam, for the whole year group.

The second area displays the class title and size while a third shows the students' names. This is cross-referenced with the exam area to produce the fourth, mark area. Marks are simply entered into the cells created between student and exam – basically a spreadsheet – by clicking and typing.

And that's about it but there are some clever tricks available. For instance you can change the total mark of an exam and automatically re-scale all the student marks in the light of that new total. You can also automatically grade marks and use ranks – which is all fairly useful stuff.

Along with this you get everything you would expect in terms of copying, sorting and so on. The whole thing is really quite well put together, the setting up of exams is simple and the statistical manipulation offered relevant and useful.

There are, however, other considerations. No matter what package you use you must bare in mind the fact that this information is covered by the Data Protection Act – it's no longer confidential the minute it's on the computer.

That aside this program is useful as it stands but it's not flexible. With all the changes being thrust upon us who knows what kind of statistics we will be expected to produce next year?

Setting up a spreadsheet to do the same job would be quite a task but you would have more control.

Summing up

The single user price is expensive but a site licence for a large school is £115 and if half a dozen departments got a year's use, it's not a bad buy – even if only to guide you to the kind of tailor-made system you need.

Product: World Map Study
Price: £42.50 (£67.50 site licence)
Supplier: ESM, Abbeygate House, East Road, Cambridge CB1 1DB.
Tel: 0223 65445
Requirements: Risc OS

Around the world in 800 words

Taking his Passe-partout by the hand, Rog Frost gets to work

ESSENTIALLY World Map Study is a collection of data with a program to allow users to access and analyse it. Some 171 countries are included.

My review copy is out of date, but with the pace of change in Eastern Europe and the old Soviet Union, it must be just about impossible to keep things topical. With that proviso, though, it is fair to say that the program does cover the entire, inhabited world.

It is loaded in the normal way and to start with, a map of the world is displayed. The left hand side of the screen has a toolbox, or set of options, rather like Draw.

If information is required about a particular country, you can select it in three ways: Point and shoot, select from an alphabetical list or type in the name of the country.

The chosen country will be highlighted on the world map. The magnifier icon can then be selected from the toolbox to show a closer view of the relevant region of the world, or you can zoom in closer for an outline of the country itself.

The familiar information icon will create a very stylish display of facts about the country. This is divided into a number of categories.

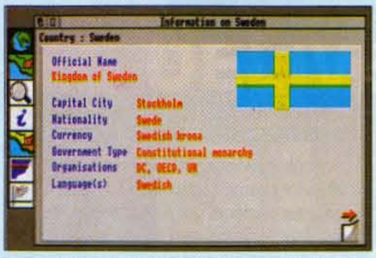
There is some general information about the country – the official name, capital city, currency, type of government and so on together with the national flag.

Next come some general geographical detail concerning land area, length of coastline and land usage.

This is followed by population information – size, growth rate and density. In the Health data section you can learn about life expectancy, fertility rates and so on. The People section also has information on literacy levels.

Then come the economic statistics for the country. The final section covers beliefs and gives an indication of the proportion of the population who follow the major world religions or have other, traditional beliefs.

Each page of data can be printed or saved as a sprite. Don't worry if you think sprites are rather a messy way of saving data, text can be saved in its entirety as a standard text file.

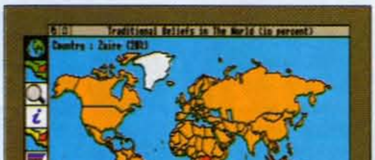


Country : Sweden

Official Name
Kingdom of Sweden

Capital City Stockholm
Nationality Swede
Currency Swedish krona
Government Type Constitutional monarchy
Organisations DC, OECD, UN
Language(s) Swedish

● **Specific facts on one of 171 countries**



● **Discover facts about beliefs, economy, health and much more**

The flag picture can be saved as a standard drawfile and all maps can be similarly stored on disc. This makes World Map Study an ideal companion to any DTP program including, of course, DeskTop Folio.

The three graph options really make the program come into its own. The first is to colour a map of the world or region according to the level of a chosen feature. The map then displays different colours representing ranges of population density.

This shows general information at a glance and, by the usual point and shoot technique, different countries can be highlighted and the detail displayed.

The next option is to display information as a bar chart. You could, for example, select female life expectancy. By default, the seven top and bottom countries are displayed along with the selected country. This can be altered, easily, in a number of ways.

You can toggle the display between all countries in the world or just those in the chosen area. The chart may be considerably enlarged to include all the countries. 171 bars will not fit on the screen but standard scroll bars allow easy access to any part of it.

The final option is to have an outline profile chart. Even on this, it is possible to point and shoot to get detailed information for any country.

Finally there are scatter graphs. Here, 171 dots are displayed on screen. Each dot represents a country's status for two fields of data.

The X axis, for example, might represent the money spent on defence while the Y axis could be the length of coastline. This is where real skill comes in since you must decide if the graph shows a pattern or if the dots are just scattered.

Scatter graphs also bring us to the National Curriculum. Pupils are expected to study a developing country and this pack allows them to identify one and obtain a lot of data.

In fact, the program has uses across all four key stages as it can be used for recognising different countries or for very detailed research.

Provision to alter information is built in, in a separate editor program. This is simple to use and allows changes to be made or whole new categories of information to be added. Unfortunately, there does not seem to be an option to add new countries.

The manual is an attractive A5-sized ring binder. Curriculum advice comes first followed by the operating instructions which are really not needed. World Map Study is a totally standard, multi-tasking program – using it is really a doddle.

One criticism is that the single user disc cannot be copied. I panic if I don't have a back-up! For secondary school use though, the very reasonable site licence allows for unlimited on-site copies.

Summing up

This program is a sure-fire winner. It is reasonably priced and geared squarely at the National Curriculum.

It fills a much needed niche and allows pupils to investigate the nature of the different countries of the world with ease. The ability to export maps, flags and text to other programs is an added bonus.

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SOMETHING FOR EVERYONE

What you see i

Mike Cook jumps on one of his hobby horses

Product : Video Digitiser Podule
Price: £49
Supplier: HCCS, 575-583 Durham Road,
Gateshead NE9 5JJ.
Tel: 091-487 0760
Requirements: Risc OS, podule back plane, video source

AS readers will know I have a very long standing interest in image processing and video digitisers. So when I saw the advertisement for HCCS's offering I just had to take a look.

For a start the price looked very good – almost too good – and the advertisement did not give away much technical information. When that happens there's usually a reason and I wanted to find it. However, I was pleasantly surprised to find it much better than my expectations.

For a start, one way you can reduce the cost of a digitiser is to slow down the acquisition speed and spread it over several frames. However, this digitises in real time, that is the time for a single frame. This is important because it means that the subject does not have to remain still.

Another way of cutting costs is to reduce the number of bits in the analogue to digital converter but here again I was pleased to see it used 6 bits.

This would give 64 different grey levels, much more than the 16 the computer display can show. Also there will be an upgrade available later in the summer to use eight bits, that's 256 grey levels. An empty socket on the board supports a forthcoming colour upgrade.

Well how is the price kept down? For a start much is made of programmable logic arrays – these clever little chips can pack a lot of functions in a small space.

Also all the software to drive the board is supplied on disc and not on an on-board eprom like many other podules – this is slightly naughty as it breaks Acorn's guidelines about podule identification.

All podules are supposed to have 32 bytes of memory to act as an ID to the system. According to Acorn the system used here, using only 1 byte, is meant to be used only temporarily during prototyping.

● Watching the criminals – CrimeWatch in Mode 15

The result is that when you issue a *Podules command it does not report the HCCS video digitiser nor report *No installed podule* but gives a blank line.

To be fair this is not likely to give you any trouble until another manufacturer tries the same trick, then you may – but it is by no means certain – get some software clashes.

The HCCS software is fully multitasking and adheres to the Desktop guidelines and here perhaps lies the difficulty with this product: The act of acquiring and displaying a picture is very time consuming and your Wimp clicks are serviced very slowly.

According to the on-disc manual the frames are displayed every second. That means although they are snapped in a single frame there is a delay before you see the new picture. This is just over a second in mode 12 but

● Self portrait in glorious Mode 21

● The difference in quality can be seen with the news in Modes 12...

increases to about two seconds in mode 15 and four seconds in mode 21.

Of course the picture quality improves all the time but having to operate the Desktop with a four-second delay between each action is rather like wading through treacle. On the other hand, you are not likely to be wanting to do much else when you are grabbing images.

Images are initially displayed in a *low quality mode*, meaning with little processing. This can result in some patterning from the colour sub carrier, if you have a colour source.

A menu option allows this to be processed to what is referred to as a high quality 256 grey scale image that will usually remove the colour sub-carrier patterning.

There is no way the computer can display 256 grey shades – the hardware limits it to 16. However, the processing dithers the picture to get a better image, just like some printer dumps produce shades from just black and white dots.

This improvement is more noticeable in the lower resolution modes like Mode 12 – it takes about 12 seconds. A brightness and contrast adjustment can be made while the images are being grabbed, which is very convenient.

The image acquisition software has a continuous mode where frames are shown as fast as possible. The manual says *when you see a picture you like, just click on the process menu option.*

In practice what happens is that the next frame is grabbed and that is the one that is processed. This coupled with the low screen update rate makes picking the right frame in a sequence quite tricky. You can save images as sprite files both in processed and unprocessed form. But there is no way to load in an unprocessed image to receive processing at a later time.

● Holiday snaps may never be the same again

● Capturing the kids is never usually this easy

It is worth remembering that the image sprite produced will have the characteristics of the mode in which it was produced so you can't use the lower modes for better response and then use the sprite in the higher modes and get any improvement.

The error trapping of the software was a cause for concern: All errors are considered to be fatal and the application will quit. On several occasions I had spent some time getting a good image, then tried to save it to disc. I got a disc full error box and the program quit taking my picture with it.

This is very frustrating, and it would be nice if the distinction was made between recoverable and non-recoverable errors.

Summing up

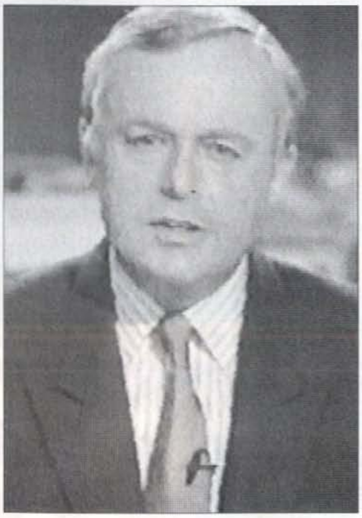
With any video digitiser the quality is dictated by the video source. Having said that the HCCS digitiser certainly makes the most of the signal you send it.

The quality of the resultant images was excellent and made the most of the computer's display capability.

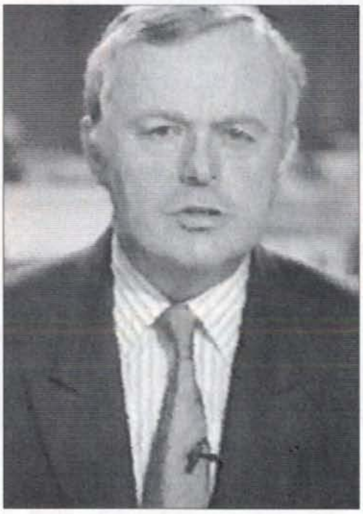
It would certainly benefit from more responsive frame grabbing software, even at the expense of not being desktop compatible. But do not let that put you off too much, the nature of a review often tends to be over critical.

The HCCS Video Digitiser is excellent value for money and produces some really excellent results.

s what you get



...and Mode 15

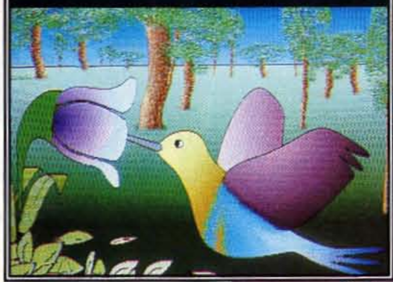


...or even Mode 21

● Her Majesty looks good, though, even in Mode 15

GRAPHIC PROGRAMS TO BRING LIFE TO YOUR PICTURES

ProArtisan £105



First there was the *Artisan* and *ProArtisan* series – still the most widely used art packages in education today. They feature an intuitive icon based menu system that has proved usable by children as young as three years old. Yet they are powerful enough to be used by serious artists.

Artisan is in its second generation (*Artisan II*) and provides many useful and unique features. This is the one for younger children and anyone interested in textile design. ProArtisan is a more sophisticated package but retains the familiar interface of Artisan II – an easy upgrade path.

Illusionist £99.95

No, this isn't a bird eating spider and no *Illusionist* doesn't replace *ProArtisan*. *Illusionist* is a graphics package for those who don't have the skills or inclination for free format painting.

With *Illusionist* you create a wire frame outline of your image using pre defined shapes. In addition you can define your own shapes or distort any existing shapes. This makes it very easy to generate images even if you can't draw a straight line. You can assign colours and textures to your objects. You can even give them texture maps. A texture map is any Mode 12 or 13 screen. So you can use a scanned or digitised image, a painting – literally anything!

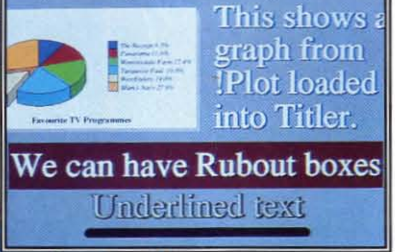
Render Bender II £99.95

NEW REDUCED PRICE

Render Bender II is another top rated graphics package from Clares. Images are created in a similar way to *Illusionist* by defining objects using pre defined shapes. You then add colour, texture, lighting etc. *Render Bender* images can include glass and mirror objects as well as shadowing. *Render Bender* actually calculates the path of light from its source to the imaginary eye at the viewing position. This path takes account of any reflections and refractions.

In addition *Render Bender* can create animated sequences very easily. You can either give objects a formula to control their movement or you can give start and end positions and ask the program to 'in between' the other frames. The result is a stand alone animation that can be passed to friends or even sold.

Titler £149.95



This shows a graph from !Plot loaded into Titler.

We can have Rubout boxes

Underlined text

Finally we have *Titler*. This is a video titling and sequencing package. The *Titler* program uses outline fonts enabling you to create text screens, credits etc. You can have any colour text, background, drop shadow, underline or rub out boxes. You can also include sprites and Draw files in your screen.

The *Titler* screens can be used in the *Sequencer* program along with screens from *Artisan, ProArtisan, Illusionist* and *Render Bender*, as well as lots of other formats. You can also include *Render Bender* or *Euclid* animations, *Tracker* tunes, *Armadeus* samples or Archimedes samples in your sequence. *Sequencer* gives you total control over the display of the screens and provides many effects to switch from one screen to the other. As well as being a tool for video titling this package can be used purely as a presentational tool for preparing and showing lecture notes, demonstrations etc. In fact all of Clares demos are now created using *Titler* and *Sequencer*. *Please request a demo disc that will illustrate the potential of these packages.*

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Circle No 7. Reader Information Service

The hard stuff

Steve and Pam Turnbull take the lid off the expansion business

Product: IdeA'92, IDE hard disc drives
Price: Subject to variation (see below)
Supplier: Ian Copestake Software, 1 Kington Road, West Kirby, Wirral, Merseyside L48 5ET.
Tel: 051-625 1006

WE have been using one of the original IdeA A3000 internal hard drives for over a year now and have found it to be very reliable. But this year ICS have released a whole new range called IdeA'92.

For the A3000 you get a 2.5in hard disc unit, about 5in long and 0.5in deep and slightly over 2.5in wide which sits crossways along the back of the micro behind the removable panel.

Fitting is easy: It's just a matter of siting the pins correctly – it will only go in one way round and it's obvious what to do. There's one flying lead to plug in which could potentially go the wrong way round, but the instructions are very clear.

Getting the lid off an A3000 can be tricky the first time you try it, and unfortunately it's even trickier getting it back on. Some sections fit inside the main casing while others lie outside, and it's not always clear which is which. However, the plastic is flexible enough and can take a lot of abuse.

The software is contained on a socketed – hence replaceable – eprom. We had an upgrade shortly after receiving the original last year and it was a simple matter of swapping the chips.

When you switch on, the hard drive icon pops up and, if you are in a quiet room, you can hear the drive spinning up to speed. It comes already formatted, so you can get going straightaway, copying over your applications and data files.

As with most hardware, if it works it works, and if it doesn't it's broken. So in use the IdeA drive works fine and there have been no long term problems.

The new range of IDE drives from ICS consists of newly-designed hardware and completely re-written software which has some features making it ideal for home use. The most significant improvement has been the addition of password protection and disc partitioning. From software you can create up to four partitions of the disc, each appearing as a separate disc drive icon on the icon bar.

Each drive can have one of four levels of password protection: No protection; read/write but password needed to alter the protection level; read only; and no access without password.

This means that all applications can be put on one drive and set to read only, then no changes can be made to them. Some private areas can be completely protected, and the rest of the disc is probably best set to read/write to prevent its protection level being altered – perhaps to no access – by some small but smart person.

On Risc OS 3 many disc operations such as copying and formatting are multitasking, unlike Risc OS 2 where they tie up the whole machine. The multitasking features with IdeA'92 are built in, so it won't tie up even a Risc OS 2 machine.

Prices for the various internal and external units are subject to change due to supply and demand on the world market – unfortunately it's even worse for the 2.5in IDE hard drive. You can expect to pay from £200 to £250 for a 20Mb drive, including VAT, while for the top range 80Mb it's £550 to £600. However, that's a lot of hard disc.

Although we've concentrated on the A3000 internal unit here, the IdeA'92 range includes external and internal drives for all the Acorn machines except the A4. The control software is not required for the A5000 as Acorn adopted the IDE hard drive as standard, so a second drive will cost less.

Other companies offer hard drives for the A3000 and, being hardware, they certainly work. However, the new ICS software currently seems to offer a very versatile solution.

A5000 expansions

Product: A5000 2Mb upgrade
Price: £105
Supplier: Leading Edge, 376 Meanwood Road, Leeds LS7 2JH.
Tel: 0532 621111

HAVING a hard disc is nice enough, but it doesn't take long to discover that 2Mb of main memory is just not enough if you're playing with 40Mb worth of applications and data. So if you have an A5000 you could do worse than check the available easy memory upgrades.

Back in the bad old days of the A300 series, a home ram upgrade was not – and is not if you still have one – a task for the faint-hearted, involving as it does pulling the machine to pieces, extracting the ARM chips, installing the upgrade and hoping there weren't any pieces left over when you'd got it back together.

Both the A400 series and A3000 had sockets for extra ram, and so it is with the A5000. The upgrade merely involves removing the lid, popping a board into a slot provided at the front next to the disc drive and adding one link. Perhaps 15 minutes if you take your time.

We tried the Leading Edge board and it was fine, but this type of *legal* upgrade is bound to conform to Acorn's standards and the limits of what the hardware itself can handle, so there's not much room for variety.

Still, while you've got the lid off, you could install a floptical – see the separate panel – or why not get a second hard drive?

Ins and outs

Product: BBC A3000 I/O Card
Price: £42
Supplier: Watford Electronics, Jessa House, 250 Lower High Street, Watford WD1 2AN.
Tel: 0923 237774

THE old 8-bit BBC Micro had a lot of ports to the outside world – primarily the User Port and analogue inputs – that were not duplicated as standard on the 32-bit machines. Acorn did produce an expansion card that gave these plus an equivalent of the 1MHz bus, however this card is only of practical use to A300, A400, A500 and A5000 series owners.

But more A3000s are found in schools, where the missing ports are in fact of more value. To fill the gap Watford Electronics produced their own board – in two forms – which fits all the Risc OS machines apart from the A4.

These two units each provide the User Port and ADC – analogue to digital converters – while the A3000 version alone also has an I^2C port, which was not available on the old BBC Micro. It offers a very economic method of extending the A3000's interfacing capabilities.

Installation of the unit is identical to that for the internal hard drive, and just as fiddly. In fact it sits in exactly the same place, so you can't have both. On the other hand since the most likely user is a school department it probably won't need a hard disc in the A3000.

The hardware provides a 6522 VIA chip, as found on the BBC Micro, which supports the User Port and a NEC uPD7002 ADC chip for the four analogue inputs. The I^2C is an extension of the bus already existing in the A3000, and is used for communication with the clock.

The support software is designed to match Acorn's expansion card and the standard operating system calls *OS_Byte* and *FX* will yield exactly the same results on the 32-bit machines as osbyte and FX calls on the BBC Micro.

One SWI call – IIC_Control – for the I^2C bus performs both read and write operations. A lot of relatively cheap hardware devices conform to the I^2C protocol and it's just a matter of plugging them in to get readings, though you'd have to write the software yourself.

When speed is of the essence – and compatibility isn't – the BBC I/O board also provides a command so that you can find out its hardware address. From there, using the information provided in the manual, you can read and write to the ports directly.

Eight of the manual's 30 pages are devoted to installation. The instructions for the A3000 are very clear and accurate, which is just as well considering how tricky the task is.

There are concise descriptions of all the interface software commands and how they are used. Examples are few, but it's a fair assumption that if you want this board you probably know what to do with it.

Of the three appendices, the first gives a detailed description of the hardware – useful if you want direct access to the chips – with illustrations of the socket connections. Unfortunately, although numbered, there is no indication from which side the sockets are being viewed. There is, however, a full description of the tolerances of each connection.

The second appendix details the differences between this unit and its BBC equivalent – primarily the fact that the BBC I/O runs faster, which might make a difference. For most applications this should be an advantage.

The final appendix is a reference for appropriate data sheets, and the manual finishes with a very thorough, perhaps unnecessarily detailed, glossary – anyone using this card will certainly know most of the definitions.

All in all, this is a very nice unit with good compatibility with its forbears and considerably less expensive than its Acorn equivalent – especially with the A3000, where there is no competition.

Big hard discs

Product: A5000 2nd hard drive
Price: £44Mb £145, 105Mb £250, 120Mb £200, 130Mb £300, 210Mb £400, 420Mb £700 for replacement or additional drives (trade-ins on original A5000 hard drive available)
Supplier: DT Software, Freepost, Cambridge CB3 7BR.
Tel: 0223 841099

Since Acorn went for IDE as the standard hard drive on the A5000 and A4 they opened the door for big – standard – expansions. Extra hard discs don't have to come with expansion cards and their own special filing systems.

This type of upgrade is classed as non-standard, which means that Acorn didn't make provision for a second hard disc in the location where the second floppy drive can go. This seems a silly mistake, because no one really needs two floppy drives when they have a hard disc.

The internal floptical also fits into this location, so you can't have both a second hard drive and an internal floptical. But then if you're rich enough to afford both – and the A5000 in the first place – you might as well get a SCSI interface and have *legal* add-ons instead.

Installing the second hard drive – we were provided with a 100Mb unit, with lots of space to expand into – was not easy. Or rather it was very fiddly and time consuming, while not actually being difficult.

The first stage involves opening up the A5000 and removing all your expansion cards, followed by disconnecting all the disc drives and removing the entire assembly of drives and backplane in one unit. A suitable crosshead screwdriver and a little oomph is all you need.

Then the hard disc is screwed on to the base plate (flathead screwdriver required, why can't people standardise?) From there it's a matter of making this and that connection, unplugging bits and bobs and adding others.

Finally you get the backplane and drive assembly back in place after much pushing and positioning of ribbon cables and power leads. We found that the screw that holds the centre of the assembly in place just wouldn't go back – something was pushing the two holes it had to fit into, out of alignment.

Nothing immediately presented itself as being the cause and it didn't look too much of a problem so, eager to test it, we replaced the expansion cards, put the lid back on, reconnected everything and switched on. Result: Still only one hard drive icon.

No problem, we'd seen this situation before. Run the !Configure application, select the drives icon and increase the number of IDE drives by one. And reboot. Voilà, a second hard drive icon.

Next time, can somebody design one that simply mounts on the back of the first hard drive – then we can have a floptical as well?

Somewhere along the line some of my configure settings were changed and the ADFSBuffers option was set to a value other than zero. Now there's a known bug in the ADFS in Risc OS 3.00 that starts losing files and generally running amok if the buffers value isn't zero.

Having just installed the second hard disc, and with this error creeping in, we began to suspect that something was seriously wrong with the hard disc.

However we eventually noticed that ADFSBuffers was non-zero, so a quick:

```
*Con.ADFSBuffers 0
```

and Control+Break reset the safe setting and suddenly all was running smoothly again. So if you find a similar problem you know what to look for.

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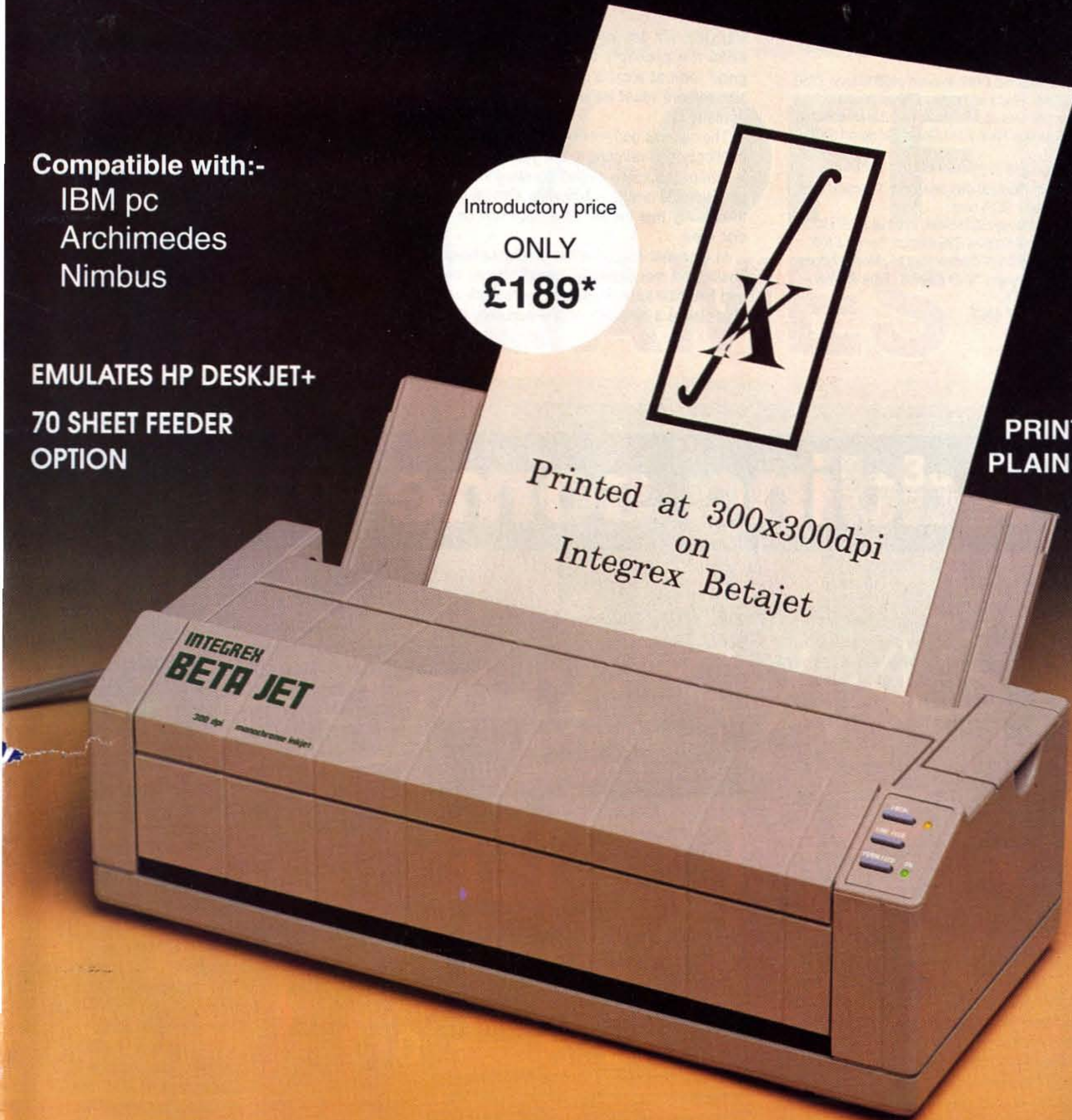
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Floptical drives: Here today, gone tomorrow?

Product: Floptical disc drive with 1 floptical disc and Econet SCSI card
Price: External £499, Internal (A5000 only) £359, 20Mb. Floptical floppies £20 each
Supplier: Desktop Projects, Unit 2a, Heapriding Business Park, Ford Street, Stockport SK3 0BT.
Tel: 061-474 0778
Product: Floptical disc drive with 1 floptical disc, includes SCSI card.
Price: External SCSI £499, Internal SCSI £425. Floptical floppies £25 each or five for £100
Supplier: Morley Electronics Ltd., Morley House, West Chirton, North Shields, Tyne & Wear, NE29 7TY.
Tel: 091-257 6355

BEFORE we get into the types of floptical drive it's probably a good idea to take a good look at what a floptical – somebody somewhere must be proud of that name – actually is.

The name is derived from floppy and optical; the floppy part referring to the fact that the disc is a standard 3.5in size and the doughnut – the bit inside the casing – is flexible. Optical refers to the way that the tracks are located on the disc itself.

In a normal disc drive the read/write head is positioned mechanically, being driven back and forwards to positions relative to track zero. This places a limitation on the accuracy of the positioning and hence the maximum number of tracks that can be put on the disc.

In the PC world, where there is the constant commercial thrust towards *more* and *better* but cheaper, the disc capacity went from 40 track to 80 track to 80 track double-sided, which gave 720k of storage. Acorn's 80 track double-sided format gave 640k originally which went up to 800k with the 32-bit machines.

The PC market jumped again by doubling the amount stored on each track taking them to 1.44Mb. Acorn used the same technique to go up up to 1.6Mb. This is now the standard, and although technology for higher densities exists there's no real standardisation. In the

Adding some joy

Anyone who has played a maze-type adventure game with the keyboard controls will at times feel the need for quicker reactions or an extra hand.

And what simulator freak at times has not wanted to abandon the keypresses for a control mechanism just like the real thing?

As Acorn machines were not built with games as their primary market, they have no dedicated joystick support, but Jersey-based RTFM as well as Leading Edge have plugged this breach. Other companies plan similar devices.

However, one very interesting development is that over the last six months Acorn have issued a standard for joystick modules, which means that you can now treat your joystick and interface in a similar way to a printer, with the dedicated software acting as a printer driver.

Some games come with RTFM or Serial Port (aka The Leading Edge) modules, but if your joystick does not have a module on the game disc then all you'll have to do is load the software for your interface disc. There may be some problems with older games which don't comply to this standard.

The Leading Edge Joystick Interface 2.40

Price: £39.95 (inc VAT)
Supplier: Leading Edge, 376 Meanwood Road, Leeds LS7 2JH.
Tel: 0532 621111

The hardware consists of a device which plugs into the printer port of any Archimedes. You can then plug in one or two joysticks in the 9-pin D sockets. You can still use the printer which daisychains on to the other side with a manual switch to activate the joystick or printer as necessary.

If you also have a dongle for Impression, Artworks and so on, the collection does look a little precarious. Luckily Vertical Twist – who designed the interface – have thought about this and there is an optional extra cable which allows you to put the box of tricks in a less hazardous position.

The comprehensive manual does warn that the joystick interface may interfere with dongle protected software, and my copy of Impression refused to recognise the hardware key unless I rebooted the machine.

On the software side, Leading Edge have put together a very nice package of programs which are given good support by the documentation. Most major new games come with the modules you need, so you load the specific module then play the game.

But what if you have got an old game or a game without a joystick option? Very simply, first look in the Start directory to see if there is a module already prepared, if not then load up JS_Tutor. For instance, the new game Cascade uses Z, X, ', / and Return. To create a module for my joystick move the joystick right and press Z and so on.

You don't need to have the joystick plugged in, as you can use the mouse and radio buttons. You can then save in the usual way.

Another application called JS_AddMod allows you to add the control module to games discs so that it is loaded automatically when you play. It can be used with old style games with !Boot files, but don't add this to an original games

PC market you can get 2.88Mb, or even 12Mb on a system designed by NEC.

However, these all use basically the same mechanism of a magnetic coating on a disc and a read/write head that's positioned relative to its starting position – the NEC drive actually contains positional information between the data tracks.

Clearly it was time for a re-think, and it was probably CDs that provided the initial idea for the system devised by InSite Peripherals. In a CD the data is read using a laser, but the position of the head is controlled by data read off the disc.

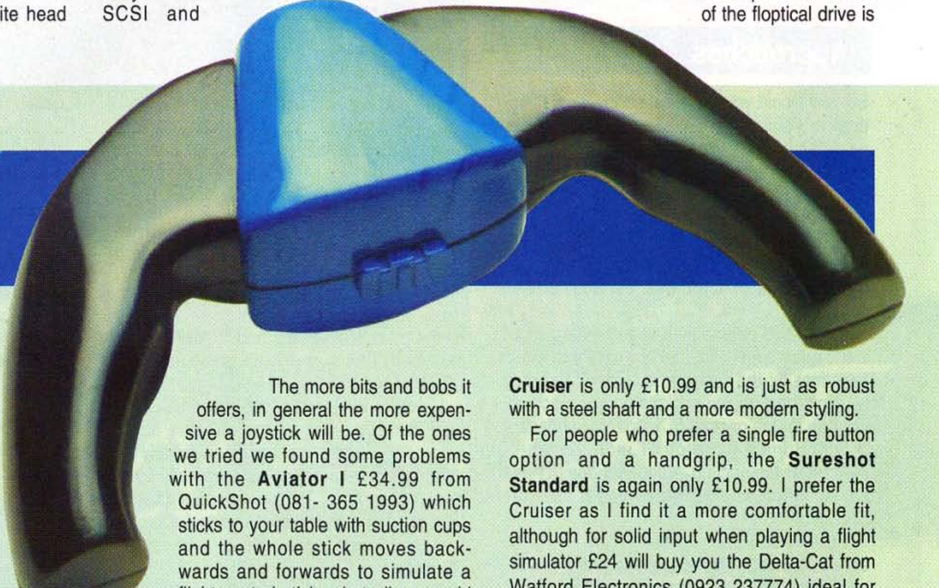
With the new method the read/write head also has an optical sensor attached to it and the disc – which is transparent – has servo tracks etched in at production time. The head is guided by its optical sensor watching the servo tracks. This type of disc has 759 tracks with a total storage capacity of more than 20Mb.

It was also decided at the design stage that a single standard interface would be used for communication with the outside world. Clearly InSite wanted their system to be easily connected to as many different computer systems as they could, so they chose SCSI and all floptical drives use that interface.

So what use is a 20Mb disc? It's great for backing up hard discs – just two discs needed for a 40Mb one, only five needed for a 100Mb, even a file server with 200Mb will need only 10 discs, and that's assuming no compression is applied.

If you were transferring large files between machines over a long distance this would be a good medium to utilise. But at present dropping one of these discs on to a hard surface can render it unreadable, so it's unlikely to replace the standard 1.6Mb floppy as the common currency of disc usage.

One important feature of the floptical drive is



disc as this could lead to problems. Rather save it to a hard disc or a working disc copy if the game allows it – otherwise save it to your Start directory.

For more complex command structure JS_Comp, JS_Test, Key_Test and the Joystick Programming Language will help. These programs are used to instruct – test and debug – JS_Comp in a textfile to translate joystick movements into key presses or mouse movements.

For instance, should the game instruct you to press the spacebar to kick and the return key to punch, your basic five movements on a joystick will not be enough. However, by using the simple language program you can press both fire buttons to simulate pressing return and either fire button to press the spacebar and so on.

Push, pull and fire

The choice of joysticks is wide. The more traditional style is a simple stick with two fire buttons, one for the right handed and one for the left, which will give all the options needed. Others are much more elaborate, especially those built to complement flight simulators.

The more bits and bobs it offers, in general the more expensive a joystick will be. Of the ones we tried we found some problems with the **Aviator I** £34.99 from QuickShot (081- 365 1993) which sticks to your table with suction cups and the whole stick moves backwards and forwards to simulate a flight control stick – but all we could achieve was left and right.

The Stealth £14.95 from Ktron (0685 722509) is built in a crescent shape with one of the handgrips moved in a variety of ways to alter direction. This takes some getting used to, and I would certainly recommend some time spent with Leading Edge's JS_Test program before you even consider playing anything.

Also from QuickShot is the Intruder I priced at £29.95. Not a subtle piece of plastic, especially with the flip up fire button cover – although there is another fire button under the grip. This handgrip model does give good control and surprisingly precise control on screen, although some of the levers are really only for show.

The **Zipstik SuperPro** from Power Play (0457 876705) is a traditional style unit and has been available for some time for the BBC B. It will take a lot of hammering, is easy to manoeuvre with a good all over action. Priced at £13.99 it compares well to others in that range. The pastel coloured **Multi-Colour Cruiser** is only £10.99 and is just as robust with a steel shaft and a more modern styling.

For people who prefer a single fire button option and a handgrip, the **Sureshot Standard** is again only £10.99. I prefer the Cruiser as I find it a more comfortable fit, although for solid input when playing a flight simulator £24 will buy you the Delta-Cat from Watford Electronics (0923 237774) ideal for seat-of-the-pants flying.

Hints and tips

As a rule of thumb opt for a joystick recommended for the Atari ST or Amiga, but if price is a consideration avoid rapid firing options or chose one that can be switched on or off, as these won't always work with the Archimedes interfaces.

The type of game you'll be playing should also effect your choice. Shoot'em-ups don't need particularly fine control, while with some arcade adventures you'll need to move one pixel at a time.

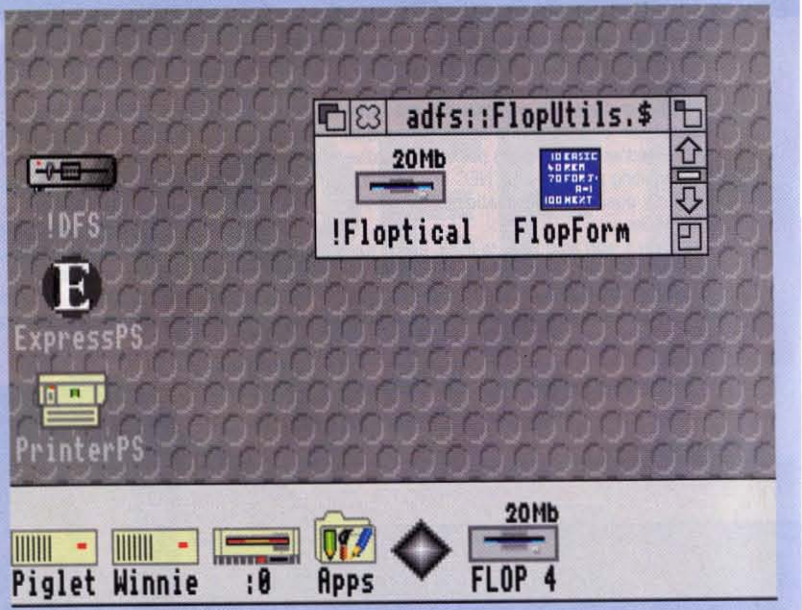
The style you finally choose – pistol grips, traditional or stylised – is in the end down to personal preference. However, if possible try one out see if you feel happy with the movement, if the base is heavy enough, the construction ready to take a bashing and so on.

Also don't forget that with some games you'll need two – or maybe more.

that it has been designed to read and write to normal floppy discs as well. So a single drive machine could have a floptical drive which would deal with 1.6Mb discs as well as the 20Mb ones.

However, because the development market is so oriented towards the PC, a problem arose. A disc track is divided into numbered sectors, with the numbering starting from one on a PC, but on Acorn's systems the first sector of a track is zero. The requirement to start from sector one has been programmed into the controlling software – firmware – that sits inside the floptical drive.

Now Acorn has requested that a change be made to the floptical firmware so that Acorn's own format can be used with a floptical disc.



How the Econet SCSI floptical looks

Approaches

So how would you go about connecting a floptical to your system? Two approaches are available, the industry-standard SCSI method or the Acorn-specific *Econet SCSI* add-on.

Morley Electronics will supply an external or internal floptical disc drive with SCSI interface, this just daisychains on to the existing SCSI system if you have one. It appears on the icon bar when you switch on as just another disc drive.

Of the two approaches, the standard SCSI is the more expensive, but normally this would be offset by the fact that it doesn't use any additional expansion sockets on the machine, just one for the original SCSI interface board.

Unfortunately the other, non-standard, method of connecting a floptical doesn't use an expansion card socket anyway it uses the Econet port.

But if you're on a network or prefer to extend by normal SCSI anyway this is certainly the best route to take. Additionally there are a number of other products – apart from Econet itself – that use this port, so you may be constrained to go for the standard system.

Using Econet

It's a certainty that when Acorn created the Econet socket on their 32-bit machines they never envisioned the strange uses to which it would be put by people who aren't connected to a network.

For the floptical system from Desktop Projects you have the option of internal – for A5000 only – or external mounting. The internal system uses the A5000's power supply and fits underneath the existing 3.5in drive. The external has its own power unit.

The control board, about 2in square, carries just two chips, and plugs into the Econet interface socket. The drive lead then plugs into a socket on this board. With a standard SCSI system the driver software is held on an eprom on the main SCSI board and is downloaded at switch on. This is exactly the same as with the CD-Rom system.

However with the Econet-based SCSI interface there's no way to load software from an eprom, so it has to be loaded separately from another disc – perhaps automatically from a hard disc boot file. This may seem a disadvantage but in practice it's no more of a problem than, say, loading up a utility to read and write PC discs.

The system itself merges perfectly with the Filer as you would expect, so all the operations are carried out as normal as far as dragging, double-clicking and so on.

Standard SCSI

The Morley floptical system is based on their SCSI interface card, and new versions now come with both CD-Rom and Floptical driver software on board as standard. When you buy any of their SCSI products you also get the interface card free – not a bad deal.

What you get is the floptical drive housed in a metal box which includes the power supply, there's a nice long SCSI cable and the SCSI card itself.

Fitting is just the same as with any other expansion card: Open up the machine, plug in the card, screw it in place and close up. Plug in the floptical, switch on the drive and the machine and there it is.

The software detects whether a drive is connected and only appears on the icon bar if there is one – the same applies with CD-Roms.

Futures

The question arises as to whether the floptical really has a future. Many formats have come and gone, raising barely a flicker on the consciousness of computer users. In the PC market it has some potential, with products appearing that require 12 or more 720k floppies to hold the software which then has to be installed on to a hard disc. Such programs could easily fit on one floptical, and could be installed in a fraction of the time.

But the Acorn market is different. The whole Impression package comes on five discs, but the main program will run straight off the floppy and only occupies about 500k. Most other major programs occupy less space than this.

Some applications may require a portable 20Mb between physical locations, but they aren't common. Flopticals may not be as short lived as some concepts but it's doubtful if they'll become very common.

Much more likely to become widespread are the new breed of hard discs that – using the floptical technique of optical positioning – can store 5.5Gigabytes on a 3.5in unit, and 1Gb is 1,024Mb. Such a drive can hold over 7,000 times as much as an 800k floppy. It's hardly comprehensible is it?

THE DRIVING FORCE

Winner of the Best Printer in the recent Computer Shopper Awards, the Cannon BJ10ex printer has revolutionised the small printer market. It offers 360 dpi, near laser printer quality, on plain A4 paper, in an incredibly compact and lightweight housing. Unfortunately the existing RISC OS printer drivers, based on the standard Acorn drivers, have definitely been in the slow lane, locking your computer up for the entire print process, often up to ten minutes per page.

Computer Concepts have now created a set of RISC OS printer drivers, called TurboDrivers, that are optimised for the Cannon BJ10ex printer. The result is the perfect combination of budget printer and RISC OS printer driver, able to print full 360 dpi high resolution pages at a quality superior to that available from any dot matrix printer.

The TurboDrivers not only print the pages faster, but give control back sooner - up to ten times quicker. The table shows the time taken to print and the time the computer is occupied for some typical example pages.

Shows optional sheet feeder attached to printer

The TurboDrivers print faster on an ARM2 machine than traditional drivers on an ARM3 machine. In addition they can send the print data to disc and then print from disc in the background, so the computer and almost all memory remains free for other uses, while the printer gets on with printing.

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BJ-10ex

	Standard Driver	TurboDriver	
	Time to complete	Time to complete	Time to get control back
A complex page of text & graphics	521 seconds	199 seconds	70 seconds
2 pages text in different fonts	753 seconds	283 seconds	64 seconds
One complex page from !Draw	643 seconds	261 seconds	187 seconds

All times in seconds from a standard ARM2 Archimedes with 4MBytes RAM and hard disc. Times would be faster for an ARM3 based machine.

BJ10ex printer & drivers £249.00 + VAT (£292.57) + p&p. Optional 30 sheet feeder £48.00 + VAT (£56.40)
TurboDriver software & printer cable £49.00 + VAT (£57.57)

Compatible with all applications that use the RISC OS printer drivers and all Archimedes models.

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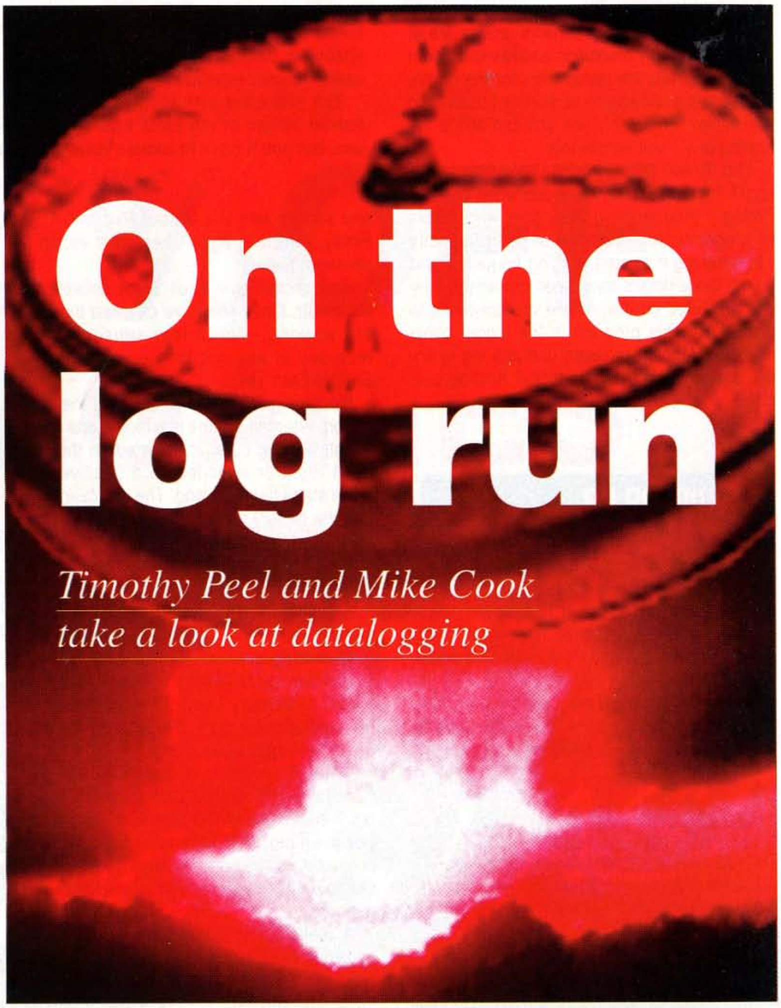
On the log run

Timothy Peel and Mike Cook take a look at datalogging



Product: LogIT
Price: £395 Starter Kit (LinkPack available to schools for BBC/Master and Archimedes systems)
Requirements: Risc OS
Supplier: Griffin & George, Bishop Meadow Road, Loughborough, Leicestershire LE11 0RG.
Tel: 0509 233344

FOR those who have not come across a datalogger, it is a basically a device which records voltages against time. The advantage of this method of recording data from sensors is that it is compact and runs off batteries, so can be used in remote locations for measuring experiments. Also it does not tie up the computer for long periods of time.

LogIT

The LogIT fits into a small carrying case with the cables and other sensor attachments. A link pack connects this to the host computer, with the relevant software on disc. It measures a mere 120 x 67 x 32mm, so you can easily pop it in your pocket and a power supply, battery charger with a fully charged battery come as standard.

The DCP bus socket is a technical expansion port. This lets you expand the LogIT to control and monitor other devices such as SwitchIT and the DAC pack which is a 1 micro-second 8-bit digital to analogue converter.

The link socket has two functions: The first is to communicate with the host computer. However the socket can be used for I^2C control bus which is available on the Archimedes.

The remaining sockets are the sensor ports. These are DIN-type and where necessary they also provide the power for the sensors. The beauty of this machine is it knows what each sensor is and its calibration range which makes the machine easier to operate.

The LogIT has two sensors: Light level and temperature. The light level sensor is calibrated in a 0-100 per cent operating range – the advantage being you are not fixed to a specific range.

Its filters allow the range to be adjusted and the device is sensitive to a wide spectrum of colour including infrared. The temperature sensor is designed to measure air, surface or liquids in the range of -20 to +70 degrees C.

The sensor is waterproof and has a resolution of 0.1 degree C, with other sensors include pH, heart rate counter, speed, voltage and so on as well as one for Philip Harris probes.

The LogIT needs to be linked to an Archimedes and the software allows you to check battery status and sensors outputs. If you wish to leave a record of specific events, you can mark the data by pressing the green button twice. An event mark is represented on the plot of the data as an arrow at the top of the graph. You can log up to four experiments before downloading the data.

Alternatively you can tell LogIT to record at a specific time or rate by downloading the details from the host computer. You specify a start and recording time as well as the time and date. The machine starts to interweave data once the initial memory has been used up.

The longer the experiment the slower the sampling rate, which obviously means that on long experiments the resolution of readings is lost. Should something happen that you didn't expect you won't have the resolution of data to analyse what happened.

Software

The computer cable connects the link socket of the LogIT to the analogue port on the host computer. The system works at two levels of manual – the *paper* manual and the *electronic* manual – one on paper and one on-line accessed via the ? key.

The software presents you with a variety of options: As It Happens allows you to check the status of the battery and the sensors output in bar chart form. This is useful since you can check that LogIT is ready.

You can then do a *live* log where the computer produces a live plot of what the logger is measuring. This is automatically scaled on the vertical since the sensor's range is known and the horizontal time axis has an initial scaling of four minutes which is doubled to eight on reaching four minutes and so on. This gives a continuous display of results with diminishing resolution.

The results are not stored unless it was logging at the time, since you are simply using the logger as an interface to the computer. But these are retained in the computer memory so that you can plot and analyse them.

Standard Zoom functions are available, with

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➤

Auto Zoom where each sensors' scales are at maximum display resolution and Marked Zoom where you state the parameters for the graph. The software allows you to remove traces from the display temporarily and you can define the scaling of a 1 volt sensor too.

The Time/Timing option allows you to tell LogIT the time and date needed when you use Prolog – programming the logger with details of a specific log. You are asked to specify when the log is to start, logging frequency and so on. Once details have been processed they can be stored on disc before you download to the LogIT. This program in the logger overrides the Autolog program until the log is finished when LogIT reverts to the Autolog program.

Summing up

The LogIT is versatile and allows you to obtain good results. The only problem is when the machine is on long logging sessions resolution is lost. If the logger could use all four channels for such an experiment or one sensor was used, the resolution could be improved.

Overall it is a good machine for short logging periods but lacks the facilities to allow it to record accurately over a long time.

Product: Easy Memory Unit
Price: £226 (DataDisc Plus £39.50)
Requirements: BBC B/Master
Supplier: Philip Harris Education, Lynn Lane, Sheristone, Lichfield, Staffordshire WS14 0EE.
Tel: 0543 480077

EMU datalogger

The Easy Memory Unit comes with a lead for charging the internal rechargeable battery and one for connecting to the analogue port of the Model B or Master.

The unit can be battery or mains operated. One useful tip is to log with the power supply connected which charges the battery at the same time. On long logging time periods, you can switch the logger off and it will switch to its internal circuits 15ms before the next reading is due. This conserves the battery – you are not really turning the logger off but putting it into a low power mode.

The first thing to do is to clear the memory of all previous data. Setting the record rate switch allows sampling to occur, from 3,000 items a second to 0.1 readings a minute with a reading every 10 minutes. There are 10 different rates on the switch and a further slide switch lets you specify per second or per minute.

Once the rate is set, you can check that the sensors are working. The device can work with any sensor with the Output Range 0-1 volt: Firstly, switch to Input Check and switch the sensor to battery.

This should give a full 1 volt deflection on the meter. Once you have checked the inputs are working – up to four sensors can be recorded at any one time – you switch the EMU to Start Test.

Recording is started by pushing the Reset button. Alternatively the machine starts when a negative-going pulse is detected on the channel 1 input or switched so a positive-going pulse starts the recording. The disadvantage is that the battery will run flat in about six hours, as the machine is fully primed.

Now start the machine and the meter will show that data is being logged by switching the Meter Switch to Each Reading where the meter needle moves from 0 to 9 and back as each reading is taken.

Another useful feature is moving the Meter Switch to Memory Used. This shows the needle gradually rise from 0 to 9/10 as the memory of the logger is used up.

Once the logging is complete, move the Function switch to Data Out as soon as possible – this protects the data from accidentally being written on. To transfer the data to the computer for analysis you must switch on Data Out to enable the computer to read the EMU's memory.

A useful facility is that if the Meter Switch is placed in Check Data Out mode the meter will flick from a reading of 10 to 0, then return to 10 again. This lets you know that the EMU's memory has been read.

The EMU reads the channels from 1 to 4 which means a fastest recording speed of 3,000 readings per second. If you join all four together you'll get a reading rate of 12,000. When you'd use such a speed is open to question, but possibly to measure the speed of sound or the acceleration of an object due to gravity.

At lower rates this facility breaks down, since the delay time between reading input 1 and 2 is constant regardless of recording rate, whereas the time between reading 4 and 1 changes. One very useful option is the facility to pause the EMU and change the recording rate.

Software

The EMU comes with a simplified version of Datadisc Plus which downloads and allows some manipulation of the data.

You'll probably need to calibrate the channels before the data is downloaded, as once it's loaded you are trapped with the default calibration range of 0-1 volt.

The calibration menu lets you set up the sensors in several ways. Once you have requested the transfer of data you are prompted for the recording rate and for the memory format to use – the safest option is to use the All instruction.

After setting the EMU to Data Out the information downloads into memory. A plot of the data is drawn on screen and you have a wealth of graph manipulation at your fingertips. Useful facilities include adjusting the axes, plotting only one channel, X-Y plotting, printing and zooming.

After you have looked at your data and decided to save it, you'll find that you will have files with strange letters after the name. If you had four inputs of data on the EMU, after downloading and saving you will have four files with the filename you saved the data under with different last letters.

For instance, if all your data was saved under the name *physics*, when you look at the data files on disc you will have *physics.a*, *physics.b*, *physics.c* and *physics.d*.

You will also have a *physics.e* file which contains the description of what the *physics* data files are about. Once you have given the computer a filename you can write a description of who produced the data

Obviously the software allows you to save and load data from disc and when loading you have quick key facilities as well as the other methods of calling up a file.

Summing up

The excellent facilities of Datadisc Plus with the EMU allow the removal or addition of points and you can use the function keys to flick in/out data plot.

This is very useful when you want to remove a single channel's data quickly.

A utilities menu calculates related data, adds it from another file, smooths it and it has the facility to draw a straight line out of the data – you can achieve funny results with this.

One point I disliked is that if you tell the computer the wrong information about the recording rate, not only is the time axis wrong but it also makes a dog's dinner of scaling the units.

I'd have liked the EMU to tell the host computer what the recording rate was. That point aside, I found it easy to use, with very few problems, particularly with the Datadisc Plus software.

Conclusions

The approach taken in the design of these data loggers is different. The LogIT concentrates in maximising software control and building in *intelligence* to its sampling rate. On the other hand the EMU relies on traditional switches knobs and meters, an approach favoured by those who are reluctant to trust the software. The EMU has more storage space for data 2k as opposed to LogIT's 240 readings per sensor. However, the LogIT is easier to use, especially if used with its own sensors.

The problems with long period logging with the LogIT must be weighted against the bulkier nature of the EMU. I personally favour the LogIT since it is compact and easy to use, but you'll have to assess your own needs and make your own decisions.

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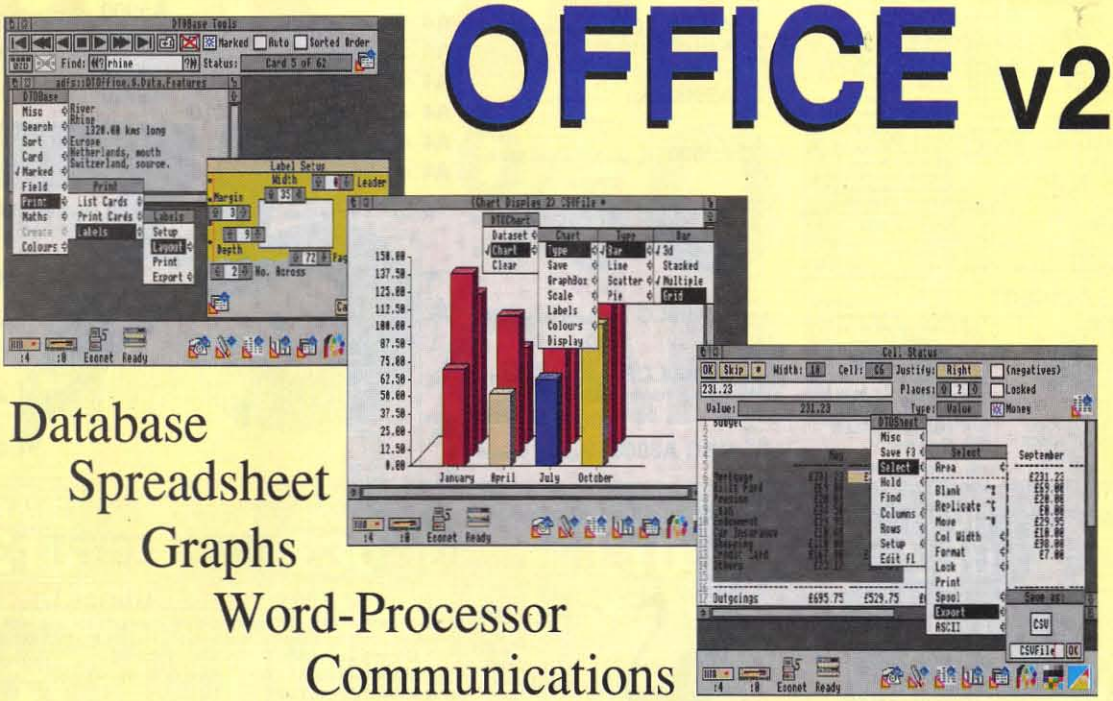

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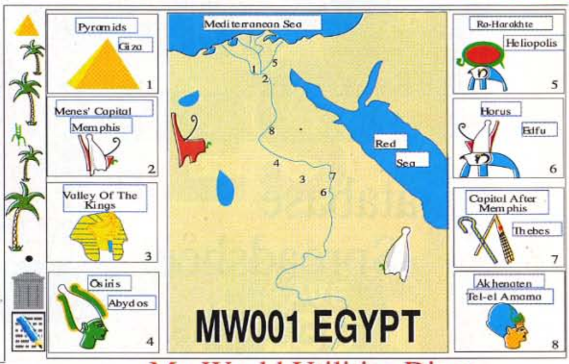
A540 4Mb RAM (Further modules can be added to provide 12 & 16Mb RAM Totals)	£399

Risc-OS 3 ROMS CALL



My World Utilities Discs

These discs are top quality multi-layer drawings for use with the My World program. Ideal for Schools, and a useful tool for the National Curriculum (KS 1/2). Coming Soon MW003 ANCIENT GREECE

Disc MW001 ANCIENT EGYPT (Sample Screen Above)	£12.95
Disc MW002 CHRISTMAS	£9.99

A Site Licence is Available for the above (Call For Details)

SG006

SG003

SG002 FI

SG001 EGYPT

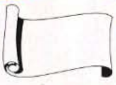
Diary
And Year Planner

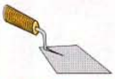
£10 +vat

The original Arthur operating system came with a diary application; unfortunately Risc-OS lost that very useful little utility. !Diary offers you all that the original program had and more: you can browse and search through your diary, customise it to remember family anniversaries, and create diaries and print out planners for next year long before they are available in the shops. You can also print out your appointments for any given month or the whole year. You can now use any Font, mark dates set alarms to remind you that you have an appointment, etc, etc.

!Condense

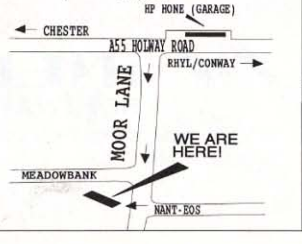
!Condense is a Spritefile Compression utility, it will allow you to store more files on disc or in memory. Unlike most routines unpacking is not done on loading, but as and when you are ready to display or use the Sprite(s) in the spritearea. This means that a large number of sprites can be loaded into memory, unpacked to the same 'User Sprite Area' and plotted using normal Acorn Sprite Calls. An example of this is in a demo file (!Condemo2) on the disc and can be seen running. This loads in approximately "THREE MEGABYTES" of sprites but uses just over 400 Kilobytes of discs space or computor memory. Ideal for use within your own programs for really fast sprite and screen manipulation.





Where To Find Us

From Chester follow old A55 past Holywell until you see Moor Lane on your right, turn down Moor Lane, we are at the bottom (Big White Farm Gate). From Rhyl (As Above) but turn left into Moor Lane before Holywell



Studio Graphics

Top quality scalable Clip-Art. We have 5 sets available on various subjects.
Discs are £8 each except SG007 plus vat. (Ideal For Schools)
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Disc SG002 Flags of the world 270 files (Colour 2 Discs £15)
Disc SG003 General 100+ files (Colour & B/W)
Disc SG004 Christmas 100+ files (Colour & BW)
Disc SG005 General 100+ files (Colour & BW)
Disc SG006 Borders & Cartoons (Colour & B/W)
Disc SG007 Borders For Use Within Poster 100 Files £10+vat

TERMS

UK residents add 17.5% VAT to all prices except books. Prices and manufacturers specifications subject to change without notification. Carriage is free (except for books and paper items) these will be shipped at cost. Goods offered subject to being unsold and/or available. Goods not offered on trial basis. If you require Next day delivery please add £12. Otherwise All goods despatched within 48 hours subject to availability. Restocking fee on non-defective returns.

In the beginning there was the word

Teri Paul surveys her public domain

LEAVING music and even sprites behind to some extent, this month we'll look at the most powerful part of human communication – the word.

Whether spoken or written, if you can't convey your meaning to others your message is irrelevant. Music and art can convey emotions and atmosphere but won't help at Asda.

I have always found letter writing to be a chore, so I took to Stuart Tyrrell's letter utility straight away. **LetterView** is designed to let you send original and highly personalised letters. You can include sprites in the text without having to resort to a DTP package and manipulate text reasonably well too.

You could use simple text files for your missives but LetterView, with its envelope icon, is much more eye-catching. Double-clicking it loads text, graphics and all into a single, scrollable window.

To compose your *billet du* all you need is Edit – which comes as standard on the Applications disc – as you'll have to amend the file named Letter with your sprites and words.

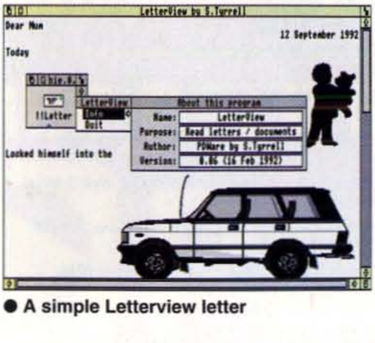
With Shift held down double-click on the LetterView icon to reveal the Edit file which will hold your letter. Purple prose can be justified left, right or centred and sprites can be treated exactly the same. As everything takes place in the usual window environment all the normal rules apply.

Although at present you will only be able to use sprite files, PD and commercial programs are out there to convert drawfiles into spritefiles. With the quantity of clip art around you can put together some very interesting letters.

Compose your thoughts in Edit and add some codes to make the text more interesting. To centre a line of text, start the line with #C, followed by your text while the right justify code is #R and so on.

Sprites can also be placed in the text, so if you wanted to centre a sprite you'd enter:

```
#SC<LetterView$dir>.Filename of sprite file
  Name of sprite
```



Dear Mum

12 September 1992

Today

Locked himself into the

Name: LetterView
Purpose: Read letters / documents
Author: PDWare by S.Tyrrell
Version: 0.06 (16 Feb 1992)

● **A simple Letterview letter**

Once finished you should have your text in the Letter file and your sprites saved within the directory as well. You could specify sprites on the recipient's hard disc – especially useful if you want to use a large sprite which won't fit on a floppy, but if the sprite isn't there an error is generated.

Not one to stand still, Stuart plans future improvements that will include the addition of drawfiles, better speed and the addition of a frame system along the lines of DTP packages so that text and graphics can be placed anywhere.

It's a neat little program and, because of the nature of the Risc OS, it is reasonably easy to add scanned images of your signature, pictures of the family and, with a bit of fiddling with sprites, different text effects. Moreover, you can pat yourself on the back for saving a tree or two.

Busby on the wire

Dave Walsh has been busy using Helix Basic to produce a very nice array of programs. First there's **Call Coster** which calculates the cost of your telephone calls at any time of the day, reading the Archimedes internal clock to determine the current rate. Handy if you prefer the spoken to the written word.

A log is available after the first call which records the start time, band, length and cost. At the end of the day you can be horrified by just how much you've spent. Once the timer has started you can't change the band so make sure that you select the one you want first.

As Dave is an IT adviser it is not surprising that his other two programs have a decided education bias – although they score high on entertainment value too. **Quiz** is a multi-tasking multiple-choice package written for a group of schools in East Kent. A number of files are available covering general knowledge, theatre and pop but the best part of this program is that you can add your own questions in any wordprocessor that saves text in Ascii. Full step-by-step details are given for the inexperienced.

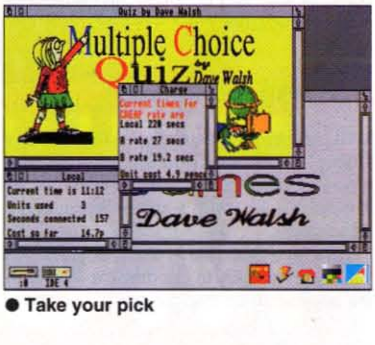
All in all an excellent resource for teachers or parents who want to reinforce a project or topic. The documentation comes on a Readme file and gives some useful guidelines and warnings of potential pitfalls multiple-choice quiz-masters may come across.

You will probably have to update your System via the SysMerge utility file and load !HelixSys – the PD module of Helix Basic – before you try to load these programs. Then everything works in the usual way from the iconbar.

Scoring is automatic and you can see how you're doing from the iconbar menu. You can start at specific questions too if you don't want a long session.

Dave's second education program is

➤



Current times for CHEAP rate are
Local 220 secs
a rate 27 secs
b rate 19.2 secs
Unit cost 4.9 pence

Current time is 11:12
Units used 3
Seconds connected 157
Cost so far 14.7p

● **Take your pick**

➤ **Wordgames**. This is basically a range of games which aim to develop skills associated with reading.

It consists of three separate programs that have been combined into one – Word Shape, Anagram and Shannon's Game. A scoring facility adds a little arcade interest rather than plain old drill and practice.

Word Shape demands that you guess the words being displayed by their shape. The screen shows all the possible words as well as the shape which is selected randomly. Choose the word by clicking on letters in the letter window which are presented in an easy to read handwriting-type font.

Anagram displays a word as – you've guessed it – an anagram. You enter the letters in the same way and the chosen word has its letters mixed up. Short words have a higher chance of being displayed as they should be spelt. In this case the word would just need to be copied.

Shannon's Game aims to improve spelling by reinforcing the rules of spelling in any language. This game has a feel of Hangman but the letters must be guessed in order. The screen shows the file name as well as the length of the word.

As with Quiz you can add your own words using Edit or Ascii files from other wordprocessors or computers by creating files of words with no spaces at the end. The file must have a carriage return after the last word in the file. Files can be as long as you want but Word Shape and Anagram will only load the first 15 words under 12 characters.

Scrabble for words

LC Howe from Romford in Essex was spurred into action by a letter in our July issue about a Scrabble game for the Archimedes. Mike Chappel from Clacton, who wanted to play that famous word game, to oblige Mr Howe has sent his excellent version.

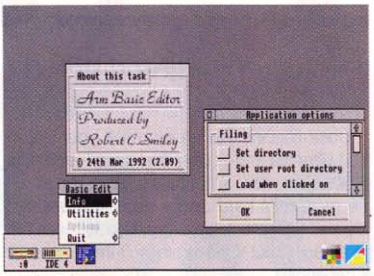
Sword has been tested quite thoroughly and there is a huge dictionary of over 34,000 words with search facilities – I just wish I knew what some of them meant.

The juggling, browsing and searching is supposed to give you a chance against an omnipotent Archimedes. You can opt to have up to four players, human or computer – I still got stuck with the Q, Y and Z and we'll gloss over the final score.

Editing the basics

MPD recently sent me a copy of Rob Smiley's **!BasicEdit**. There are a few Basic editors around, so what does this one do? For a start it includes a file coder, a space stripper and a Basic printer.

Loading a Basic file is straightforward and you have the ability to just drag the icon on to the application on the icon bar. If you prefer you could select the auto-run option in the application menu and double-click on the file icon.



● Back to basics

While this option is selected two other features can be used. Holding down Shift and double-clicking on the file icon runs the file instead of loading it into the Basic editor, while Shift+Alt+double-clicking on the file icon loads it into Basic but not the editor. If you prefer you can always use Shift and click on the icon to enter Basic without accessing the Basic editor.

Don't panic if you want to return to the Desktop – hold down Shift and Ctrl and press F4. There are two ways to re-enter the Desktop from Basic – F5 or type QUIT and press Return.

Writing or editing your program is then up to you but you'll need to run it sometime by holding down Shift, Ctrl and F12 or press F11. You can pop back into the program by pressing Print.

The built-in file coder can be accessed via the applications menu. Then drag the file that is to be coded on to the application icon. From the menu move the pointer across the arrow beside the Code file option. A window will be opened to save the code. The two radio icons on the right of the window let you determine if the code has a Basic file type or not.

The print option has a No Indent option which removes all indents from files loaded into the editor – a nice time-saving feature. All in all it is a very useful and nicely put together program.

PD LIBRARIES

8-bit houses

BBC PD,18 Carlton Close, Blackrod, Bolton BL6 5DL.

Different Ideas PD, Eyton House, Eyton, Leominster, Herts HR6 0AG.

Elk PD, 5 Edward Street, Clifton, Brighouse, Yorkshire HG6 1QR.

Frisky Clams, 37 Cassiobury Drive, Watford, Herts WD1 3AA.

GLM PD, 2 Pierrefondes Avenue, Farnborough, Hampshire GU14 8NF.

HeadFirst PD, 97 Chester Road, Southport PR9 7HH.

JD Public Domain, 7 Klembergerweg, 7214 BK Epse, Holland.

JJF PD, 49 Hollberry Close, Wingates Green, Redditch, Worcester B98 0QT.

Robert Pike, 4 Mayfield Road, Girton Cambridge CB3 0PH.

Mad Rabbit PD, 174 Duke Street, Southport, Merseyside PR8 5EL.

MasterDisc, 2 Seaview, Hoylake L47 2DD.

Re-Run, 1 Northholme Close, Grays, Essex RM16 2NX.

ScreenTeach, 21 Highlands Road, Rochdale, Lancashire.

The Wizard - BBC, Ryburn, Thorpe Lane, Cawood, Selby, North Yorkshire YO8 0SQ.

32-bit houses

Abyss Software, 35 Grantley Crescent, Kingswinford, Valley Fields, West Mids DY6 9EH.

Arcaynia, PO BOX 1927, Sutton Coldfield B74 3YZ.

ArchAngel, 9 Chancel Court, Chancel Lane, Pinhoe, Exeter EX4 8QE.

Arch PD, 109 Ferry Road, Hullbridge, Hockley, Essex SS5 6EL.

ARMistic, 136 Wellesley Road, Ilford, Essex IG1 4LJ.

Busy Bee Computers, PO Box 25, Ormskirk, Lancashire L39 3QR.

RE Clark PD Library, Westbourne House, 34 Bradley Street, Wooton-under-Edge GL12 7AR.

Cream PD, 38 Baunton, Cirencester, Gloscester GL7 7BB.

Datafile PD, 22 Duxford Drive, Aldergrove, County Antrim, Northern Ireland BT29 4BG.

Diamond PD, 86 Meadowbank, Moor Lane, Holway, Holywell, Clwyd CH8 7EF.

DataStream, 32 Hollinwell Avenue, Wollaton, Nottingham NG8 1JZ.

Digital Illusions, 20 College Road, Wembley, Middlesex HA9 8RL.

Digital Phenomena, 104 Manners Road, Southsea, Hants PO4 0BG.

DigiTech PD, 20 Downing Crescent, Bottesfird, Scunthorpe, South Humberside DN16 3LS.

Equinox PD, 27 Station Road, Earls Barton, Northampton NN6 0NT.

Genesis PD, 19 The Greenway, Hillfields, Bristol BS16 4HB.

Low Cost PD, 6 Furzeland House, Sheephouse Way, New Malden, Surrey KT3 5PH.

Mad Rabbit PD, 174 Duke Street, Southport, Merseyside PR8 5EL.

Naked PD, Fayence, Fulford Road, Fulford, Stoke-on-Trent ST11 9QT.

Ozone-Friendly PD, 180 Cumnor Hill, Oxford OX2 9PJ.

Power to the Programmers, 1st Floor, 23 Cooper Street, Nelson, Lancashire BB9 7XW.

Prime PD, 29 Tulworth Road, Poynton, Stockport, Cheshire SK12 1BQ.

Risc PD, Potteries House, Rannoch School, By Pitlochry, Perthshire PH17 2QQ.

RML PD, 24 Penryn Close, Norwich NR4 7LY.

Skyfall, PO Box 2220, Birmingham B43 5R2.

Soft Rock Software, 124 Marissal Road, Henbury, Bristol BS10 7NP.

Spidersoft PD, 218 Saville Park Road, Halifax, West Yorkshire HX1 2XS.

Telstar PD, The Jam Factory, 20 Alderbrook Close, Rolleston, Staffs DE13 9AH.

Matthew White, The Pines, 7 Peasehome, Hessle, North Humberside HU13 0HY.

EXCLUSIVE PREVIEW

Guile

...flyboy fever

LOST in space you have wandered on to the solar jet stream and into the Azran solar system on the outer spiral arm of the Megellonian galaxy – slightly more thrilling than taking the wrong turn on the M25.

There is no Dr Smith, no robot and no family to keep you company. Totally on your own you must cross the system on the Orbit Express to escape.

The entire system was formerly a penal colony with all lifeforms living underground in huge caverns hewn from the rock by convict labour. Now it's home to a thriving economy that expanded after Blackhole Monday wiped out the galactic economy.

The interplanetary transport craft is manned by frightfully polite but mercenary captains who won't let you on without the price of a ticket. This leaves you with just two choices: Stay and live with Azzies, or earn your passage by collecting gold from the caverns.

Guile combines elements used successfully over the years: 3D vector graphics, trading and piloting your spaceship past hurdles and obstacles from pterodactyls – found on Hermhaeven, the deserted movie set planet – to stalactites testing your expertise and panache.

In an amazingly addictive amalgam of Zarch, Elite and Thrust, Guile, written by Andrew Martin, the author of Air Supremacy, puts you at the controls of a craft that handles like a dream once you sort out the control system. The mouse gives the best results and when you get the hang of the movement it is – relatively – plain sailing.

You must pilot the CV2000 through a maze of underground adventures. But you can't take all day: The interplanetary ships leave to schedule and you have a time limit to find goods with which to trade – successfully – to buy the passage one step closer to your nearest and dearest.

The prose which greets your successes and failures is atmospheric and doesn't take itself too seriously with just the right injection of humour and puns.

You start with a basic amount of money and a ship parked on the teleport dock. By flying north you pass through caverns and tunnels that curve and arch. Here and there are trees, bushes and rocks plus whole expanses of water – watch out for the water spouts. In the first cavern there's one bar of gold and one gem but there's no point trying to beam them into the ship just yet.

Travelling on you finally reach the end and another teleport station. Landing – you don't have to be too neat about it – you switch to trading mode in which you can buy a unit that will hold the altitude you set – essential for gold collection.

Lots of other goodies are on offer: Weapons, loads of fuel, shield restoring and so on. Then it's back into the cavern to get that gold – just hang over it and get down close then a long press of the Tab key will beam it up, Scotty. Then it's back to the teleport station to trade it in for more money.

Pretty simple? Well not quite, sometimes caverns barely taller than your ship are filled with stalactites and stalagmites that you have to negotiate. Tunnels are scarcely wide enough but descend so rapidly that it takes an ace to negotiate them properly. Then there are the other ships, doors across the tunnels and flying rocks to name a few.

Though not specifically a combat game, there are things to shoot at – like trees blocking a tunnel and vigilantes who don't like the cut of your jib.

The early tunnels are just single ones in a straight line, but further on you'll find cross tunnels – then your compass comes into its own.

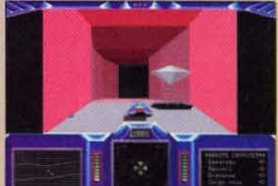
Guile uses the laws of physics thoroughly: Every time you pick up gold your ship gets heavier and uses more fuel. Some planets have a much higher gravity and some a lot less – and you'll need gold for ballast.

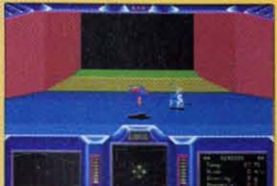
This isn't a game for the timid but if you want to try something that's a bit out of the ordinary, this is definitely for you.

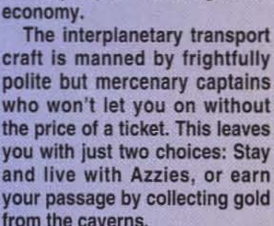
Lazarus

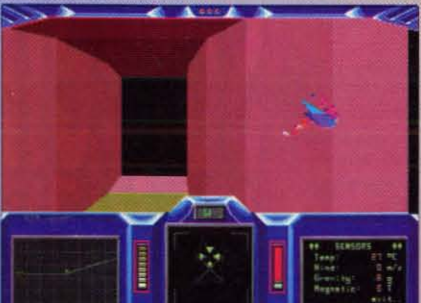
Next month: Exclusive to Acorn Computing

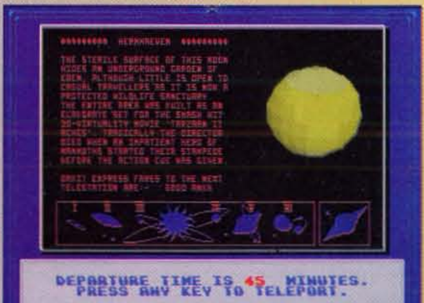
Special levels of Guile will be available FREE with every copy of the October issue of *Acorn Computing* incorporating The Micro User.











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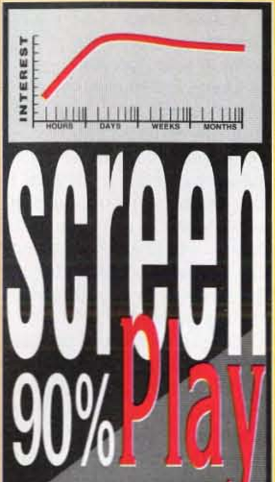


Play it again Sam 17

...challenging collection

Price: £14.95 (5.25in BBC)
£19.95 (3.5in Master Compact/Master 128)
Supplier: Superior Software, PO Box 6, Brigg, South Humberside DN20 9NH.
Tel: 0652 58585

ANOTHER excellent selection of games for the summer comes from Superior this month under the Sam heading. So much code is squeezed into this release that no tape option is available. All these games have been seen before, and emphasis is on sport with Summer Olympiad and Master Break on the menu.

The now defunct Tynesoft produced some truly excellent games and though Summer Olympiad is not one of my all-time favourites its value for money cannot be overstated. There are five events to play and they are not the over-televised over-hyped sports which you may well have had your fill of recently.

All events have three rounds and Fencing is first. The scoring is simple: The first player to score three hits in a bout wins with the keyboard controlling the movement, ripostes, parries and lunges.

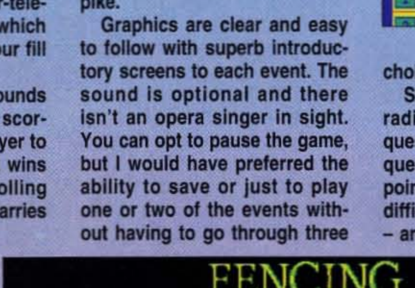
The Triple Jump follows and this is my favourite and the trickiest to get just right. The Z and X keys must be pounded to get a good run up, only pressing the spacebar when you reach the white bar – too far and it's a foul jump. You now move to control the angle of your hop, skip and jump and to gain a medal – hopefully.

Skeet shooting is not a sport I have come across before but it is very similar to clay pigeon shooting. Although a nice point is that in a tie the person with the most ammunition left wins. Again there are three rounds and you have 24 moving targets to hit.

Moving from field to track events you are presented with the Hurdles. Timing is essential in the real life event as well as the computer simulation and the secret of success is getting the right rhythm.

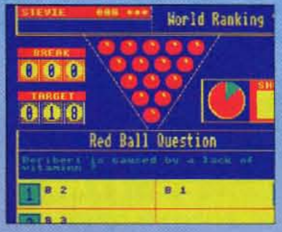
Barcelona's outdoor diving event gave viewers a memorable view of the city and some amazing underwater shots too and this is your opportunity to emulate some of the artistry yourself. Style, complexity and individuality are the order of the day as you rotate, tuck and pike.

Graphics are clear and easy to follow with superb introductory screens to each event. The sound is optional and there isn't an opera singer in sight. You can opt to pause the game, but I would have preferred the ability to save or just to play one or two of the events without having to go through three rounds of each to get to the one you want.



Though Summer Olympiad was written for the last Olympics, author Kevin Blake should be pleased that this masterpiece in its own right hasn't dated – it was good to see it again.

Staying with the sporting theme we move on to Master Break where you pot the black by showing off your general knowledge of science, pop music, geography, leisure, arts and history in this multiple choice quiz with a difference.



Similar in concept to DLT's radio quiz you alternate each question with a random red ball question which gives you one point. You can then choose the difficulty level – time to answer – and subject of the next questions.

Choose a black ball question and you'll need the reflexes of Mr Higgins himself to get to any key, never mind the right one. Get one wrong and you're out, though you have three pass options on red questions.

The questions are very nicely put together and are a challenge to an individual or a group and with foul shots and time limits to keep you on your toes you'd better get into training immediately.

Tactic is new to the BBC being written by Andrew Pepperell for French software house Eterna and converted from the Archimedes version. It's a simple one or two-player matching game which can drive even normally sane people to the status of gibbering wrecks.

Basically, different coloured balls and blocks come on to the screen. Underneath is a key or shapes these can be formed into: 3-object straight lines, crosses and squares.

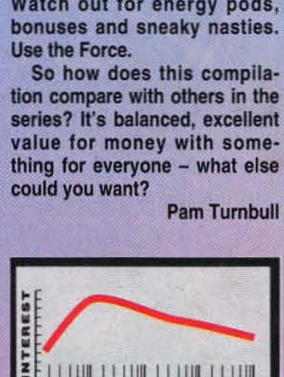
All you have to do is match the number and types of patterns required with the objects falling on screen using left and right keys. Luckily there is a pause option so that you can gather your thoughts and later levels are passworded.

Last but not least is the classic Video's Revenge which has been around for many years. Yet it is just the thing to let you vent your frustration after failing a dive, irritation with a nasty science questions or fury at an illusive square out on a inanimate animated alien.

It's a shoot-'em up where you can move up, down, left and right as you scroll up the screen illuminating each wave before they mutate. The further you get the more furious the opposition becomes and the more necessary the smart bombs and cloaking device. Watch out for energy pods, bonuses and sneaky nasties. Use the Force.

So how does this compilation compare with others in the series? It's balanced, excellent value for money with something for everyone – what else could you want?

Pam Turnbull



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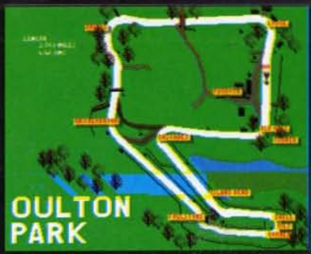

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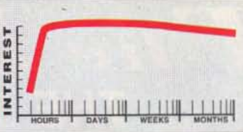
Cascade

...wet, wet, wet



Screen Play
93%
PRESENTATION

Price: £8
Supplier: Richard Norman, 17 Luard Road, Cambridge CB2 2PJ.
Requirements: Risc OS

WHENEVER a game arrives for review that has no fancy box, no instructions and isn't by a recognised person or company, a groan goes up all round: *Oh no, here we go again. More people who think they can write good games.* Well that's how Cascade arrived.

So having drawn the short straw, I loaded it up – it's got a pretty icon and the title screen's nice, though it looks a lot like Cataclysm.

Moving on I discovered good graphics on the between-levels screens, password system for levels, return to desktop icon, analogue volume control and on screen help to tell you what everything is. So far so good, and better than expected.

Still no idea of what keys to press but let's click the start icon and see what happens. There's a *Loading level 1* message followed by some text that tells me I've got to collect 10,000cc of water, there's a time limit of five minutes and I've got eight blocks – whatever they are.

Pressing space takes me to the playing screen, nice 256 colours, Mode 13 – better than Cataclysm – and here comes the water. Okay, where am I? Press the standard keys Z, X, " and ? and a little ball bearing starts moving about the screen. Yup that's me.

So what do I do now? Well the water's pouring down into a room which has an exit blocked by a bung, so it's staying put for the time being. I'll take a look around. Assuming the water behaves as expected there's a hole into which it will fall if it's not blocked off – must be what the blocks are for.

A quick press of Return reveals ... nothing, so I move away and discover that a block remains behind. Great. Next the bungs – how do I remove them? Well I don't seem to have a gun – there's only me, the blocks and the water.

Try running straight into a bung. Yes there it goes and the water stays right where it is – looks like I'm blocking the way. Back off downwards and it follows me down.

Down we go into the horizontal tunnel and the water floods out, behaving exactly like, well, water. It bubbles, it flows and it runs along surfaces and generally downhill.

In fact it's a bit more active than water usually is. It has no surface tension so when a couple droplets land on a surface they don't stick together, they're apt to just zoom off. The surfaces are frictionless too – once those droplets get going they just keep on moving.

To cut a long story short, the first screen isn't too hard and it helps you get the hang of everything. Instructions in the help file are brief and to the point, and also give you an idea of what you can expect in the later levels.

There are pistons which will only depress when there's enough water pressing down on them, and blocks that prevent your passage but dissolve when they're hit by water.

Some blocks allow you to pass through but not the water, while others allow you to go through only once or only one way. There are teleports – for you, not the water.

Then there are the switches. These can open and close doors, activate teleports or activate water-controlled switches. They change when there's sufficient water on top of them and they too can open and close doors.

But the bane of your water-moving life will be the exit-sealing water switch. If just one drop of water lands on this type of block the exit is sealed and the level is over.

So is this game like Cataclysm? Superficially yes, it's got water and you have to collect it in a certain place at the bottom – there's no fancy invented plot here, just a puzzle game with no pretensions.

Two onlookers, independently, described Cascade as like Lemmings and that's more accurate. It's got the same highly addictive quality, the graphics are excellent and the sound is used sparingly but effectively.

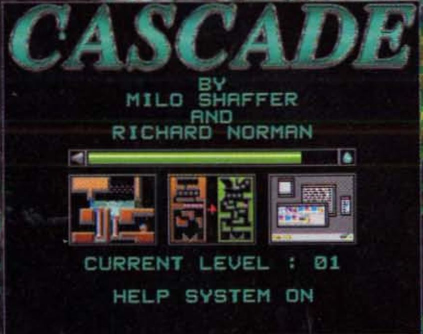
Each level has a password and you're given the next one on completion of a level. If you fail or quit from a level you can just go straight back into it, there are no *lives*, which is also very similar to Lemmings. And it's this feature which aids the *just one more go* syndrome if you haven't quite managed to finish.

If it has any failing at all it's that the gradient of difficulty could be a bit gentler. The Lemmings fun screens led you very gently through the skills needed to play the game at its higher levels.

In Cascade I found level 10 quite hard while level 12 needs to be done so fast you can't afford the slightest error. Level 15 has me stumped – but I'm still going back for just one more try.

I hold up my hand and say I was wrong. This game is not only written by people who *think* they can write good stuff, they *can*. Cascade is brilliant and very reasonably priced. Now go away, I'm trying to work out how to stop the water closing off the exit pipe on level 15.

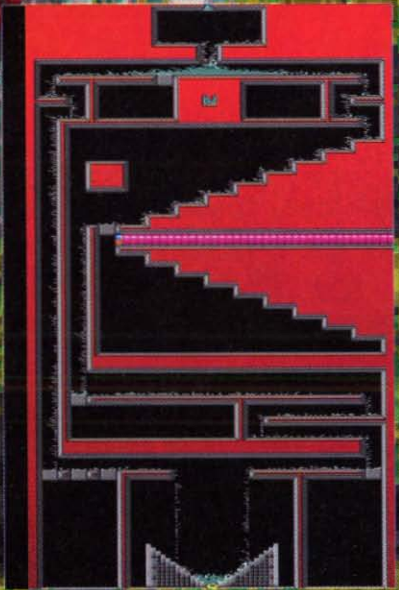
Geoff Brown



CASCADE
BY
MILO SHAFFER
AND
RICHARD NORMAN

CURRENT LEVEL : 01

HELP SYSTEM ON



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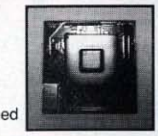

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...one for the library

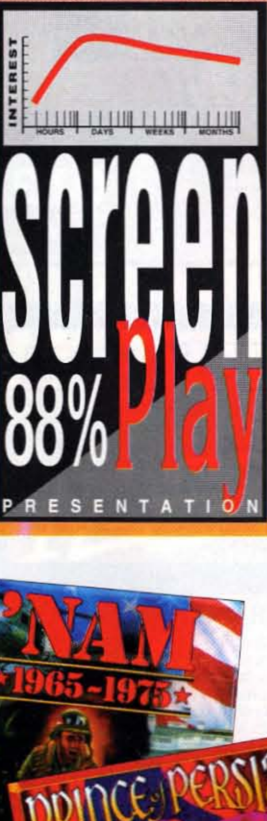
FOLLOWING the recent success of compilation titles on the BBC Micro, it comes as no surprise that they are beginning to appear more frequently on the Archimedes. Krisalis have come up with a superb collection: Pipemania, Mad Professor Mariati, Terramex and a new release, Revelation.

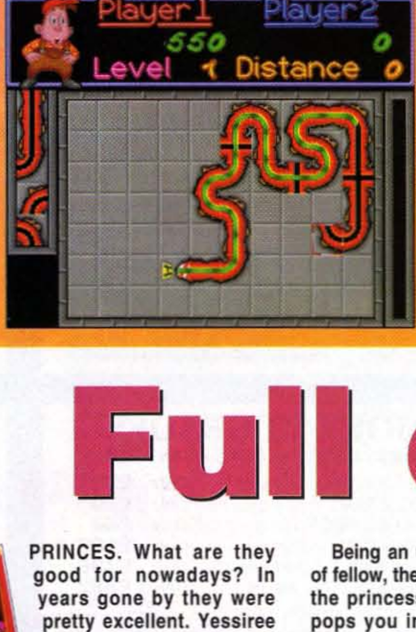
In Pipemania the object is to construct a pipeline using various angled pieces of pipe, in order to accommodate a liquid called flooz. From the outset this game sounds fun, and it is!

Two players can compete against each other using either mouse, keyboard or joystick and you can choose from three levels of difficulty.

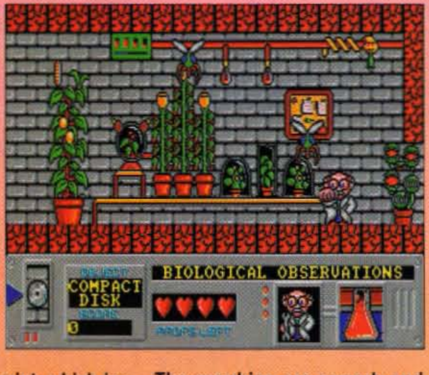
The left hand side of the screen shows the next five pieces of pipe available and the centre of the screen houses the grid where these pieces must be placed. The current scores are shown at the top and the time before the flooz flows is displayed as a long bar on the right hand side.

Once the action begins, you frantically place your angled pipes, plumbing them into the starting point, which is placed randomly on the screen. The best tip is to plan ahead.





As you progress through the screens, the time before the flooz flows is shortened and it will move at a faster rate, obstacles are placed in your way and bonuses can be achieved when the flooz flows through pieces of bonus pipe.



The graphics are superb and the sound is sufficiently pitched in tone and quantity not to break the concentration. This is one of the most addictive games I have played.

Next comes Mad Professor Mariati which uses cartoon-style graphics and has some extremely catchy tunes throughout. This is very much a platform-type arcade game with an eccentric professor who has been ordered to close down his five laboratories containing his various inventions. Unfortunately, all the laboratories are running wild with monsters and

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'NAM
1965-1975
PRINCE of PERSIA
Broderbund

Full of East

PRINCES. What are they good for nowadays? In years gone by they were pretty excellent. Yessiree Jim Bob. The prince I had in mind was the Prince of Persia and his story goes like this.

While the Sultan is away fighting those evil Christian types the dastardly Grand Vizier has taken over the country and is being generally nasty to the people. He has also fallen for the Sultan's daughter, but you – the hero – and her, are already in love. El problemo.

Being an understanding sort of fellow, the Grand Vizier locks the princess in his bedroom, pops you into a nearby dungeon, nicks your Andy Williams record collection and takes away your Arsenal season ticket – it's not all bad then.

Those splendid people at Domark have decided to let you carry on the tale. You play the part of the Prince and have to escape the platformy dungeon environment and get to the princess to save her from the evil clutches of the Grand Vizier.

The main problem is that you have 12 levels to complete and just one hour to achieve your goal. You may well have heard of Prince of Persia before, as it has been out on other formats for quite a while – it's even on the Gameboy.

To put it briefly *(please do, Ed)* the game is brilliant, exquisite, superb, magnificent and outstanding. The graphics are not fantastic, the idea not original, but that doesn't matter when the game itself drips playability.

The animation of your character is magic: He walks, leaps, ducks, crawls, tip-toes, hangs, and fences with the greatest of ease. And when I say he fences,

llection

bad guys, ranging from Chip Worms to Mutant Masticators.

You can choose to enter any of the five labs by simply moving to the door and opening it. All the rooms have a totally different theme and whichever lab you decide to enter, you are greeted by ladders, monsters and puzzles.

The idea is to solve puzzles using various objects left lying around. Collecting tokens as you move around will let you purchase additional stronger weapons in place of the spanners, which you can fire to kill or stun the enemies. The graphics are good – just watch the Professor tap on your monitor when you are not moving him or even when he jumps on to the electrical bulbs. Every- thing on the screen is active.

Your quest in Terramex is to seek out and rescue Albert Eyestrain, the famous Professor, who can be found somewhere in the desert mountain range.

This awesome task is made slightly easier, as you can choose to be any one of five characters, each representing a different country.

Monsters are deadly: Just one touch and one of your precious lives has gone. It is at this point that I wish there was some means of picking up extra lives on the way though the screens, but never mind. Watch out for the creatures hiding in the rocks, and the water droplets. All are superbly animated.

Puzzles must be solved all the way through and objects must be taken to certain areas, including playing a musical instrument in order to pass the deadly snake.

Terramex is a delight to play, although the lives situation is a bit tough, but having said that it's a game that I am wholeheartedly addicted to.

Last, on this compilation is the new title, Revelation, the idea of which is very strange. Each screen shows the outside lock mechanism of a safe and the dials must be turned in such a way as to crack the code and get to the contents.

It's a game for one or two players, and you can use the usual controls but personally I preferred the keyboard as it's far more precise. Each safe mechanism is different and you must arrange the wheels to match correctly the coloured arrows on the screen.

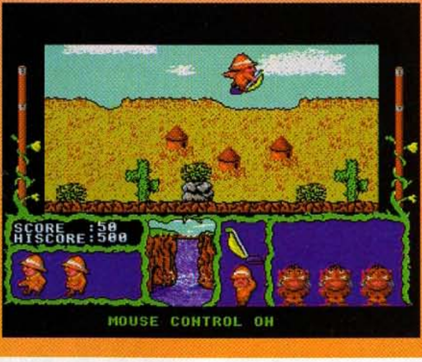
Dials can be turned both ways and have various colours on them. When you're turning, if one wheel touches an identical colour on an adjacent wheel, this will rotate to prevent the colour clash.

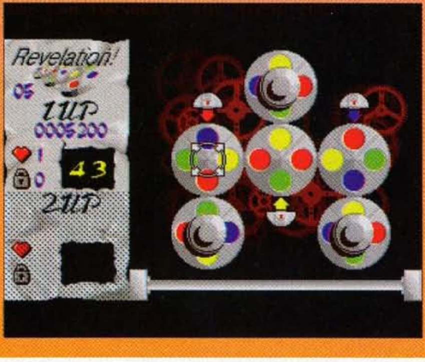
This makes it extremely hard at times although you do have a lock facility, which enables you to lock the wheel of your choice from automatically rotating,

Sometimes I found myself completing a screen without even knowing how I had actually achieved it. If you plan ahead, you can predict dials moving and so become expert.

Bonus signs appear, to stop the clock as well as others, which will help in trying the crack the safe – if you're lucky. Unfortunately this game isn't up to the usual Krisalis standards and cannot even begin to match the other three titles, but it is extremely original and makes a refreshing change. Overall, this compilation is superb!

Brett Colley





ern promise

I don't mean he gets three dozen eight by twos, 160 two inch nails, and a hammer. Oh no. If your chap can find a sword, he can go around lopping off the dungeon guards' limbs.

The fighting isn't actually fantastically life-like, as our prince has only got two basic moves, thrust and parry. But if you combine these with stepping forwards and back, you get enough variation to make the sword fighting bits pretty exciting.

The main emphasis is not on fighting but on exploring and puzzling. There are levers, switches and drawbridges aplenty and all the time the clock is running down.

You may think to yourself that the game is going to be a bit short-lived if you have to complete it in an hour, but it will take months of playing to get to the stage where you can complete all 12 levels in an hour. And every minute you play will be pure bliss as the control system is so wonderful. Any drawbacks? Nope, not really.

Domark are also dithering about releasing the Archimedes version of 'Nam. It's a sort of political/military simulation of the Vietnam war where you play the President of the USA – a kind of football manager with bullets.

Once again it's been out on other formats for over a year but the Archimedes version is still pending. I expect it sold rather well in the USA because we all know that they are the world champions at war and I can see loads of elderly generals ranting and raving over the screen yelling: "Let's nuke those pinko commies Bubba!" Yes, well, hum.

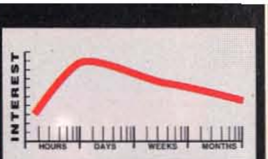
Don't get too excited though, as on present schedules it could be next year until either game is released. Domark have had some notable successes on the Archimedes – and BBC B and Master – in the past, but Archimedes new releases from them look like being few and far between. This is a shame as they have some nice offerings.

Ben Reilly

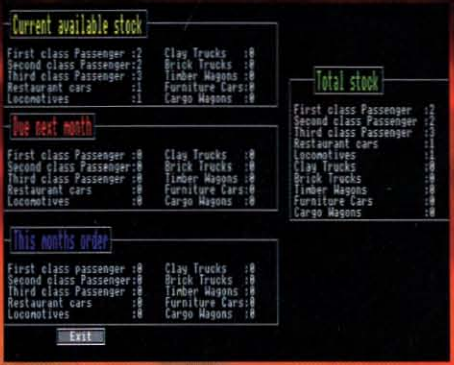
Price: £14.95
Supplier: UK Software, 38 Midlands Estate, West End, Southampton SO3 3AD.
Tel: 0703 474681
Requirements: Risc OS

Days of Steam

...do the locomotion



Screen Play
88%
PRESENTATION



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First class passenger :0 Clay Trucks :0
Second class Passenger:0 Brick Trucks :0
Third class Passenger :0 Timber Wagons :0
Restaurant cars :0 Furniture Cars:0
Locomotives :0 Cargo Wagons :0

Total stock
First class Passenger :2
Second class Passenger :2
Third class Passenger :3
Restaurant cars :1
Locomotives :1
Clay Trucks :0
Brick Trucks :0
Timber Wagons :0
Furniture Cars :0
Cargo Wagons :0

THE aim of Days of Steam is simple – make as much money as you can by setting up and running a railway system for 12 or 25 years. You begin in January 1923 and – if you take the 25 year option – end in 1948 when the railways were nationalised.

Before starting you have the opportunity to generate one of three levels of map. Basically, the more rivers this contains, the more the level of difficulty increases for the simple reason that every time you build a bridge it costs £100,000 and that tends to eat into profits.

You start with half a million pounds, one locomotive and some passenger rolling stock, plus a map bereft of railways and stations but dotted with the occasional city.

The next task is to choose the site of your first station and it is here that some of the basic rules of the simulation come into play. Three classes of city as well as ports are situated along the rivers and there are two kinds of manufacture – firing kilns and furniture factories.

First and second class passengers will only travel to first or second class cities while third class passengers aren't choosy at all. Second class cities produce export goods which need to be taken to river ports. Here the raw materials of clay and timber can be collected for transport to the relevant factories which then produce building materials and furniture which need to be taken to cities too.

All these factors have an influence on your choice of routes and rolling stock if you are to be cost-effective and the early emphasis tends to be on cost in a big way. Each station will set you back £100,000 and before you can build a train you also need to install a construction yard – costing a further £50,000.

If you intend to carry exports and such, each station where they are to be collected and delivered needs a goods yard at £65,000 a throw. All of a sudden that £500,000 you start with doesn't look much – and we haven't built a yard of track yet. That costs between £625 and £1,125 for every 10 miles. You have some control over revenue as you can determine the level of passenger fares within certain limits: £1 per 10 miles travelled is the minimum you can charge and £15 the maximum. The default fares are £12 for first class passengers, £10 for second and £8 for third.

Your aim is to maximise profits, but the rate at which you set fares influences the rate at which cities generate passengers, so it doesn't pay to be scrooge-like too early on. Mind you, once things are going nicely, and cities are proliferating you can gradually start to put the squeeze on.

As time passes and you begin to make a little money the next task is to extend the railway. Lengthening the track and adding stations is the first option, and building additional trains is another. These options need to be kept in balance since more trains means more revenue – eventually. However, there is that little matter of cost once again.

A locomotive will set you back £50,000 as will a first class coach. A restaurant car – a nice little earner – doesn't come cheap at £30,000 and goods wagons cost anything from £15,000 to £20,000. Of course you can always get an overdraft of up to £100,000 if you fancy paying interest at 35 per cent.

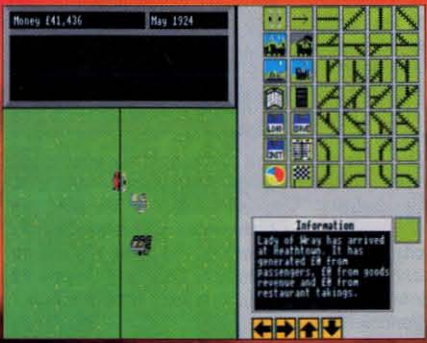
Various facilities are available which enable you to keep track of the load a particular train is carrying at any one time, how much revenue it has generated to date, how many passengers or goods are awaiting collection at any station, how much revenue the station has generated and so on.

You can re-timetable a train at will, though as your network enlarges this can get time consuming. You could alter rolling stock schedules to suit individual catchment areas and generally do just about everything a real railway operator can do.

The graphics are fairly basic. They are informative but the animation of trains was slow on my Archimedes which lacks an Arm 3 chip.

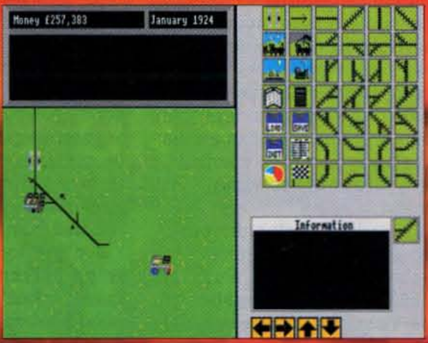
As well as railway buffs falling for this, popping my school governor's hat on for a moment, I reckon this program could be an asset in the classroom at middle school level. Be warned, though, I found it very addictive. I have only one gripe, my son David is above me on the high score table. Greedy swine.

Mad Hatter



Money £41,436
May 1924

Information
Lady of Wray has arrived at Heathtown. It has generated £0 from passengers, £0 from goods revenue and £0 from restaurant takings.



Money £257,383
January 1924

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Never bee

WELCOME to this, the final column of my tenure as Hacman – I have finished all my levels and chomped all the ghosts so I'll be playing a new game. But never fear, there will be a replacement.

To round off we're going to take a look at material from the past five and a half years that's never been published so without further ado, let's dive in and do it.

Colin MacConnell of Kingswinford, West Mids, notes that the best way to kill the Demon and Drax in **Barbarian II** is with flying neck chops but be careful not to fall down the hole when killing the Demon.

P. C. Jones of Toredyriw, Mid Glamorgan, has written with details of an invulnerability feature built into **Talisman** for the Arc. To activate it start the game as usual then press Copy to pause. Now hold down 2 on the main keyboard and press £. Now when you unpause you're invincible.

If, in spite of my cheat routines in the January 1992 issue, you're still having problems with **The Last Ninja**, here are a few useful hints from Simon Earl of Wimborne, Dorset:

- The gun should be used to kill the spider
- The glove is needed to pick the rose safely
- The stick is the most powerful weapon
- The key opens the door – big surprise
- The claw allows you to climb
- The rope allows you to escape from the lowest level.

James Treadwell of Southport reveals that the Electron version of **Saracoid** features a built-in cheat facility accessible from the title screen, not the animated demo screen. Press *I* and *L*, you may then choose to start on any level with eight lives.

Superior cheats

The 5.25in version of the Superior Collection Volume 1 featured **Syncron**, **Airlift** and **BMX on the Moon** so here's a trilogy of cheats to match them:

SYNCRON

```
 10 REM Syncron Infinite & Extra Lives
 20 REM for Superior Collection Volume 1
5.25" disc version
 30 REM by Hac-Man 1992
 40 REM (c) The Micro User
 50 REM
 60 L%=3:REM No. of lives (1-9)
 70 FOR I%=0 TO 2 STEP 2:P%=&7 800:[OPT I%
 80 LDA #96:STA 2457:JSR 2304
 90 LDA #96:STA 29774:SEI:JSR 29709
100 LDA #&A9:STA &F84 \Infinite lives
110 LDA #L%:STA &ADF \no. of lives
120 LDX #13:JMP 29776
130 ]:NEXT:*FX200,2
140 MODE7:*FX15
150 PRINT"Insert Superior Collection disc"
160 PRINT"Side 1 and press any key...";
170 A%=GET:PRINT:*INIT
180 *LOAD SYNC
190 CALL &7800
200 END
```

AIRLIFT

```
 10 REM Airlift Infinite Lives
 20 REM for Superior Collection Volume 1
5.25" disc version
 30 REM by Hac-Man 1992
 40 REM (c) The Micro User
 50 REM
 60 osbyte=&FFF4:oscli=&FFF7
 70 FOR I%=1 TO 2 STEP 2:P%=&900:[OPT I%
 80 LDX #0:.loop LDA kybd,X:CMP #&FF:BEQ
end:TAY:TXA:PHA
 90 LDA #&8A:LDX #0:JSR osbyte
100 PLA:TAX:INX:JMP loop
110 .end RTS
120 .kybd:]:NEXT
130 P$="END"+CHR$13+"OLD"+CHR$13+"38 SORTIE%
=129"+CHR$13:REM Infinite lives
140 $P%=P$+"RUN"+CHR$6+CHR$13+CHR$255
150 *Key0 *Load Airlift 1900|M*Load Air3
2900|MPAGE=&1900|MEND|MOLD|M120PAGE=&2900
:CALL&900:END|MRUN|F|M
160 MODE7:*FX15
170 PRINT"Please insert Superior Collection
disc,"
180 PRINT"side 1, and press any key...";
190 A%=GET:PRINT:*INIT
200 VDU21:*FX138,0,138
210 END
```

BMX ON THE MOON

```
 10 REM BMX on the Moon Cheat
 20 REM for Superior Collection Volume 1
5.25" disc version
    30 REM by Hac-Man 1992
         40 REM (c) The Micro User
            50 REM
             60 S%=0:REM Start level (0-7)
               70 L%=3:REM No. of lives (1-
              128)
               80 osbyte=&FFF4:oscli=&FFF7
               90 FOR I%=0 TO 2 STEP
              2:P%=&900:[OPT I%
              100 LDA #96:STA 2713:JSR 2560
110 LDA #S%:STA &36FC \Start level
120 LDA #&AD:STA &3937 \Infinite lives
130 LDA #L%: STA &370E \No. of lives
140 JMP 27648:]:NEXT
150 MODE7:*FX15
160 PRINT"Please insert Superior Collection
disc,"
170 PRINT"side 1, and press any key...";
180 A%=GET:PRINT:*INIT
190 *Load BMXMoon
200 CALL&900
210 END
```

n seen before

Deadly assistance

The aim of **Nightshade** – apart from just staying alive – is to find four special objects, each of which will kill one of the four otherwise invincible creatures. The Gavel will kill the Skeleton, the Hourglass deals with the Grim Reaper, the Cross disposes of the Monk and the Bible is the nemesis of the ghost.

Personally, even with my infinite lives poke, I have only ever seen one or two of these creatures and objects – but perhaps this tip, from Robin Pike of Girton, Cambs, will be of use to better players than I.

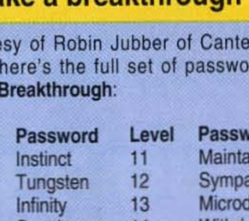
Open the box

Matthew Bloch of Headington, near Oxford, has sent me a couple of useful tips for **Brixx** featured in the Archimedes Christmas Box from RTFM. The scrolling text mentions that it has a cheat mode – in fact there are two.

The first is a level jump activated by pressing Control+N,J,H and C simultaneously when you're on the title page. The second gives you 42 lives and is put into operation as follows:

Start as usual but while the computer is talking to you press both Alt keys. You'll hear a sound like an alarm and the message *Cheat mode. You now have 42 lives* appears on the screen.

Thank you Matthew.



Make a breakthrough

Courtesy of Robin Jubber of Canterbury, Kent, here's the full set of passwords to ASL's **Breakthrough**:

Level	Password	Level	Password
1	Instinct	11	Maintain
2	Tungsten	12	Sympathy
3	Infinity	13	Microdot
4	Scrutiny	14	Withdraw
5	Ligament	15	Estimate
6	Prologue	16	Software
7	Retrieve	17	Toboggan
8	Vendetta	18	Diameter
9	Rhapsody	19	Specimen
10	Monorail	20	Terminal

In Arthur's court

When playing **Camelot** a general rule is to collect all energy and bags of gold wherever possible. So, from the start go left and then down to collect the first key. Take this to the base of the central tower and open the door. Use the key suspended in the air as a step to reach the ledge.

Go to the top of the tower and collect the rook. On the way down take the second key. At the base of the tower go two rooms right and open the door there with the key.

Go right to the Round Table and the rook will remove the knights. Go up the ladder on the left and collect the pencil from the room you find. Take the pencil to the drawbridge and *draw the bridge*.

Once it's down proceed left to the dragon's lair and collect the third key. Return to the castle and open the door in the room to the right of the drawbridge. In this tower you will find a spell book – take it past the floating bag of gold to the King's Head room. Press Shift to fire a spell from the spell book to kill the wizard.

Go down the wishing well, then right along a passage until you come to the teleport spell book. Go back to the wishing well and fire the first teleport spell which sets the return point for the teleport itself.

Go down to the very bottom of the well and collect Excalibur, noting the message *Dig at due north.* Go right for the fourth key then fire the second teleport spell to return to the wishing well.

Go back to the dragon, collecting the spade on the way and slay the dragon with the sword. Collect the Holy Grail, go all the way left and collect the gold then return to the opening to the dragon's lair.

Note the pattern in the stars: The top two make a line to the north so dig (go down) directly beneath them, open the fourth door and make your way to the gold. Go back to the throne room, open the door with the Holy Grail and sit on the throne to complete the game.

The puzzle with the stars is pretty tough but anyone who found the crowns in Citadel should be able to cope.

Tally ho, Ginger!

Stephen Scott of Englefield, Surrey, has sent me a tip for **Chocks Away** from 4th Dimension which will no doubt be gratefully received by anyone having difficulty with the higher missions.

It's a simple one-liner that allows you to select any mission on the selection screen. Insert disc 1, press F12 and then type:

```
LOAD adfs::0.$.!Chocks.ChocksAway
```

and press Return. This loads the control program and automatically takes you into Basic V. The line you need to change depends on the version, it's line 2300 on the original and 3100 for the upgrade. Type LIST xxxx, where *xxxx* is the line number for your version.

You should get the following line:

```
xxxx MM%=0:REPEAT:MM%+=1:UNTIL MM%=20 OR HIGHSCORES%!(13*4*(
MM%-1))=0:IF FLAG=0 THEN MM%=20:FLAG8=(FLAG*FLAG7*(ATN 1))
```

Edit this line to read:

```
xxxx MM%=20::IF FLAG=0 THEN FLAG8=(FLAG*FLAG7*(ATN 1))
```

Now type RUN to execute the program with the cheat in place. *xxxx* refers to the line number for your version.

End game

As I close my last column I wonder whatever happened to the games that never quite made it to the screen: **Maltese Joe's Pool Challenge, Destiny, Firetrack II** – will we ever see them?

Those questions, gentle reader, I will leave with you. So until we meet in the arcade, keep taking the power pills!

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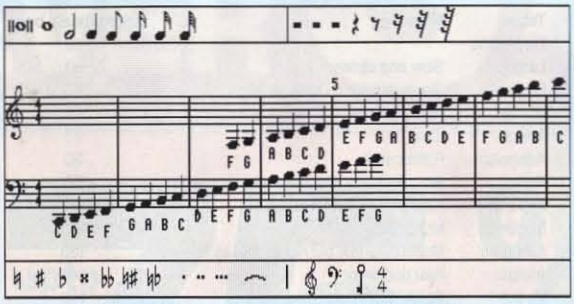
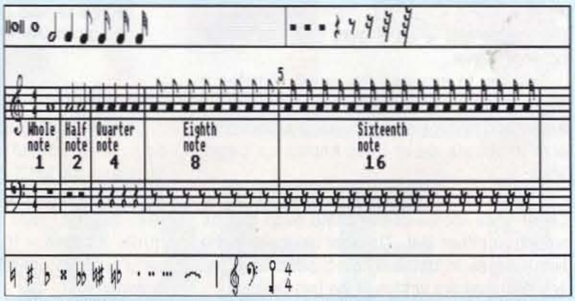


● Figure I: The Treble and Bass clefs complete the Leger lines



● Figure II: The note durations and their ratios to each other

The sound of music

Ian Waugh gets you started with Maestro and music notation

The Archimedes is unique in the world of personal computers as it comes with a range of ready-to-go applications including a music program called Maestro.

This serves as a good introduction to music in general and making music with your Archimedes in particular. Maestro can also act as a springboard to more sophisticated applications such as working with digitised sound samples, scorewriting and sequencing with synthesisers.

In this series we'll go from those very first steps with Maestro to other, more sophisticated applications. Everyone can join in the first few parts of the series as they only require the Maestro program which all Archimedes owners have.

If you like what it can do, you can then consider whether to invest in some of the commercial music programs available.

First steps

Like all Archimedes applications, Maestro is very easy to get up and running. Double-click on the Maestro icon to install it on the icon bar. An even easier method is simply to double-click on a Maestro file which automatically installs Maestro and then loads the file.

The first thing to do is expand the display by clicking on the upper right corner of the window – the toggle size icon – so it fills the screen. It shows more of the score which makes it easier to work with.

You might also like to change screen modes. Click Menu on the Palette icon on the icon bar and select Mode. If you are using a standard monitor, Mode 12 gives you a large window with big notes which is useful while editing.

Mode 16 – you'll have to enter the 16 at the bottom of the Mode menu – is better for viewing more of the score. For those with multisync monitors Mode 31 shows a nice big editing screen while Mode 39 is very wide.

To play a tune, click Menu over the Maestro window and click Select on the Play option at the bottom of the menu. The music will play and the score will scroll across the screen. Click on Play again to stop the playback.

Select Instruments from the menu and drag the pointer across to the right and you will see a window which shows which sounds have been allocated to the staves. If you click on the actual Instruments heading in the menu, the window will stay on screen after the menu has closed.

You can alter the sounds simply by clicking on the names. The Select and Adjust buttons scroll back and forth through the list. At the moment you will probably only be able to select five sounds, the ones which come with the computer but later in the series we'll see how to use others.

Alter the Volume and the Tempo by selecting these items from the Menu. You can load another piece of music by picking up a tune icon and dragging it to the Maestro window.

Music notation

Even though many professional sequencers running on other computers don't use music notation, many of the basic Archimedes music programs do – including Maestro. If you're sitting in a garret creating your own music you may not need notation but it is the most universal form of music communication in the Western world.

Notation gives you access to a vast range of music including rock and pop, standards, classical and jazz and you'll find it well worth learning. Before we go any further, let's define the terms.

At first glance, music notation may look as though it has been created by a spider which has crawled through an ink pot and walked over a sheet of paper. It's actually not as difficult to understand as you might think. Let's looks at the basic building blocks with the help of some pictures from Maestro.

Pitch

Music contains two elements – pitch and rhythm. Pitch is indicated by placing notes on the lines and spaces on a stave made up of five horizontal lines. The higher up the stave, the higher the pitch of the note.

There are over 100 pitches commonly used in music. It would be impossible to show the full range on a five-line stave so clefs are used to indicate where the pitches start. The two most common clefs are the Treble (upper stave) and Bass (lower stave) clefs which you can see in Figure I.

Notes are named according to the letters of the alphabet. The distance between two notes with the same name is eight notes or an Octave. You can see from Figure I that the notes in the same position on the stave in the Bass clef are lower than those in the Treble clef.

For example the note on the lowest line in the Bass clef is a G while that same position in

➤

➤ the Treble clef is an E over one and a half octaves higher.

In order to increase the range of notes a single stave can display, you can place notes above and below the stave and give them their own miniature stave lines known as Leger lines.

You can see these again in Figure I. Using Leger lines, notes of the same pitch can be written in either clef. The first example is the two F notes in bar 3. They are identical but see how they are written in the two clefs.

You can use as many Leger lines as you wish but the music becomes difficult to read if you use more than three or four. The C in bar four is commonly known as Middle C.

Rhythm

The rhythm determines the duration of each note and is shown by adding tails to the stems of the note heads. Long notes have a hollow head and very long notes have no stem.

Figure II shows the most common note durations and their ratios to each other. It's important to realise that each bar in the figure lasts for exactly the same length of time. In other words, if you add up the total durations of all the notes in each bar they are the same.

It's also very important to realise that note durations have nothing at all to do with tempo. The speed of a piece is determined solely by the tempo instruction, no matter how many *short notes* it contains. Durations only show the *relative* length of the notes to each other.

Maestro supports three note durations not shown on the stave in Figure II but you can see them in the top left of the Maestro screen: The Breve and the two shortest notes – a 32nd and a 64th.

The Breve is rarely used nowadays and is most commonly found in medieval music but it can be useful in Maestro as we'll see later. Sixty fourth notes are almost, but not quite, as rare – thirty second notes are more common.

Silence plays an important part in music, too, and the equivalent rests are shown in Figure II in the Bass clef. The rest symbols for a Breve, Semibreve and a Minim all look the same – a black block – but they occupy different positions on the stave.

A Breve rest fills the second top space on the stave, a Semibreve rest hangs from the second top line and a Minim rest sits on the middle line. Maestro will position these automatically when selected.

● The tempo settings in Maestro

Term	Meaning	Approximate bpm
Largissimo		40
Largo	Slow and stately	50
Larghetto	Slowly but not as slow as largo	60
Grave	Slow, solemn	65
Adagio	Slow	70
Adagietto	Rather slow	80
Andante	At a moderate (literally, walking) pace	90
Andantino	A little faster than Andante	100
Moderato	Moderately	115
Allegretto	Moderately fast but not as fast as Allegro	130
Allegro	Fast and lively	146
Vivace	Quick, lively	160
Veloce	Swift, quick	175
Presto	Very fast	190
Prestissimo	As fast as possible	210

Tempo

Tempo instructions are traditionally given in Italian. They sometimes indicate the feeling behind the music as well as its speed – as in Grave.

However, the terms don't indicate an exact speed in bpm (beats per minute) so the performer still has some control over the speed. Some composers, particularly more modern ones, also include a bpm rating on their work.

Largissimo doesn't appear in any music dictionary although the intention is obviously a speed slower than Largo. Lento would have been a better term.

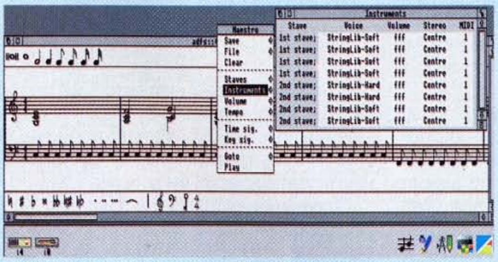
Shown above are the tempo instructions used by Maestro and the approximate bpm speed at which it plays them.

An explanation of the complete rudiments of music would take a couple of hundred pages. However, this article and the next will give you a good basic knowledge of notation, enough to tackle the entry of a piece of music from a score into Maestro.

It's well worth buying a book about notation for reference. For the theoretically inclined there is *The Rudiments and Theory of Music* published by The Associated Board of the Royal Schools of Music which contains everything you need to get through graded music exams.

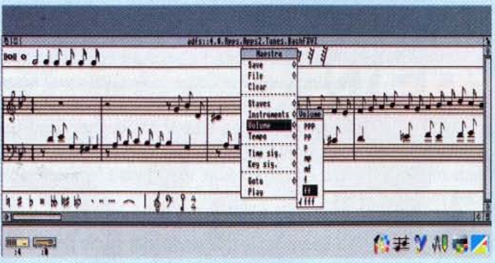
For the complete beginner, however, I can heartily recommend an excellent, easy-to-read book called *The Basic Guide To How To Read Music* by Helen Cooper published by Omnibus Press and distributed by Music Sales. Both books should be available from all good music stores.

● *Next month we'll add to our knowledge of music notation and enter a piece of music into Maestro.*



Stave	Voice	Volume	Stereo	MIDI
1st stave;	StringLib-Soft	fff	Centre	1
1st stave;	StringLib-Soft	fff	Centre	1
1st stave;	StringLib-Soft	fff	Centre	1
1st stave;	StringLib-Soft	fff	Centre	1
2nd stave;	StringLib-Hard	fff	Centre	1
2nd stave;	StringLib-Hard	fff	Centre	1
2nd stave;	StringLib-Soft	fff	Centre	1
2nd stave;	StringLib-Soft	fff	Centre	1

● **Clicking on Instruments in the menu leaves the Instruments window on screen**



● **Adjusting the volume in Maestro**

Volume instructions

Standard music notation was developed over the years, mainly by scholars who understood Latin and Italian which is why most musical terms are foreign.

Volume commands are abbreviated instructions derived from three words – Piano meaning soft, Forte meaning loud and Mezzo meaning moderately (literally, half). Piano is a contraction of the word Pianoforte meaning soft/loud.

Here are the volume instructions and their meanings used by Maestro:

Abb.	Term	Meaning
ppp	Pianississimo	As quietly as possible
pp	Pianissimo	Very soft
p	Piano	Soft
mp	Mezzo Piano	Moderately soft
mf	Mezzo Forte	Moderately loud
f	Forte	Loud
ff	Fortissimo	Very loud
fff	Fortississimo	As loudly as possible

Note durations

Durations can have two names – English and American. The American versions are much easier to understand. The durations supported by Maestro are:

American	English
Twice a whole note	Breve
Whole note	Semibreve
Half note	Minim
Quarter note	Crotchet
Eighth note	Quaver
Sixteenth note	Semiquaver
Thirty second note	Demisemiquaver
Sixty fourth note	Hemidemisemiquave

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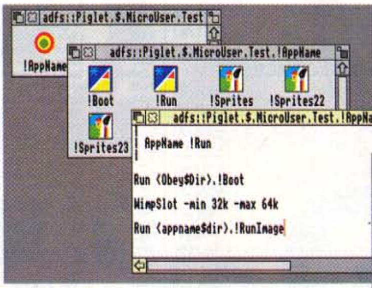
(B) BBC (M) Master 128 (C) Compact (A) Archimedes

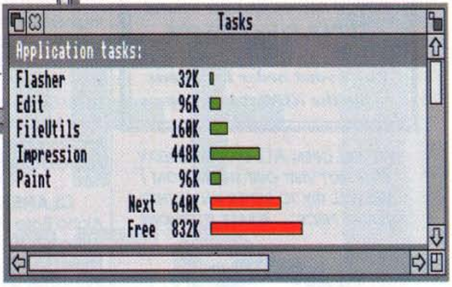
Steve Turnbull reveals more about the essentials of designing your own applications



adfs::Piglet.$.MicroUser.Test
!AppName
adfs::Piglet.$.MicroUser.Test.!AppName
!Boot
!Run
!Sprites
!Sprites22
!Sprites23
adfs::Piglet.$.MicroUser.Test.!AppName.!Run

```
| AppName !Run

Run <Obey$Dir>.!Boot
WimpSlot -min 32k -max 64k
Run <appname$dir>.!RunImage
```

An example of a WimpSlot command



```
Application tasks:
Flasher        32K
Edit           96K
FileUtils     160K
Impression    448K
Paint          96K
         Next 640K
         Free 832K
```

The Task Manager Next and Free slots

Lebensraum

CREATING applications for the 32-bit Risc OS machines isn't the easiest thing in the world but Acorn didn't make it any easier by spreading the information through four volumes of the Programmer's Reference Manual.

This month we're looking at the environment in which a program runs, which means having sufficient space in which to run, having the necessary system variables and resources on hand and loading any modules required.

Last issue we saw the basic structure of the !boot file and how a command to run the !boot file of an application is also included in the !run files so that no repetition of the data is needed.

The next step is to allocate a certain amount of memory to your program. The default for this is 640k but using the WimpSlot you can allocate as much or as little as your program needs.

The precise syntax for the WimpSlot command is:

```
WimpSlot [-min] <size>[K] [[-max]
<size>[K]]
```

Looks complicated? Well the first point is that the items in square brackets, [ ], are optional and those enclosed in triangular brackets, <>, should be replaced by something else.

A typical WimpSlot command would be:

```
WimpSlot -min 64k -max 128k
```

This means: *The next program to be run must be allocated a minimum of 64k but if more is available, give it the extra up to a limit of 128k.* If less than 64k is available an error is produced and the program won't run.

You can leave out the *-min* and *-max* markers:

```
WimpSlot 64k 128k
```

which has the same effect as the example before.

You could also leave out the 128k:

```
WimpSlot 64k
```

but this means something different: Now the program will be given the available memory as long as there's more than 64k, if not an error is generated as before.

If you open the Task Manager window you'll find two red bars marked Next and Free at the bottom of the Application tasks section. It's the bar called Next that is affected by the WimpSlot command. Alternatively you can drag it to various positions. However, a WimpSlot will always override it.

The exception is where the *-max* value has been left out, in this case the maximum amount of memory allocated is whatever is in the Next slot. Under normal circumstances this will be 640k but you can drag it to any position you like.

Leaving out the *k* is not a good idea because without it the numbers refers to pages of memory. On a 1Mb machine a page of memory is equivalent to 8k. On 2Mb it's 16k and on a 4Mb (or higher) machine one page is 32k.

So if you've written a program on a 1Mb machine and you've discovered that the following command gives your program enough memory:

```
WimpSlot 8 8
```

someone running the same program on a 2Mb machine will allocate twice as much memory as it needs and a 4Mb computer will provide four times the amount needed – in this case 256k – where 64k would be enough.

Loading modules

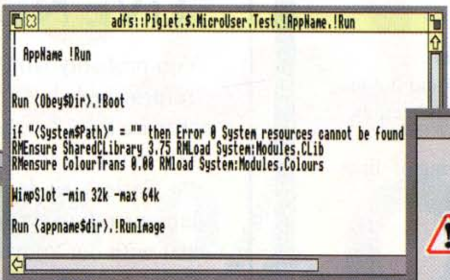
If you take a look at various !run files you'll see a command *RMEnsure* occurs quite frequently. This is used to load up a particular version of a software module into the Relocatable Module Area – RMA.

A module is a standalone program that extends the capabilities of the operating system by providing extra commands. It's called *relocatable* because it doesn't matter where it is in memory, it will still work. This is important because you can't know which modules have been run before the one you want is loaded.

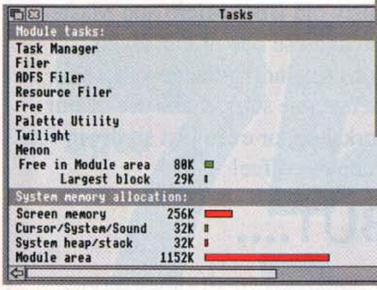
A module may be a multi-tasking program in its own right and may put icons on the iconbar. The ADFS is an example as is the Palette or the DTP program !Menon. A module might just add some extra star commands or provide some special services.

The DTP program Impression uses several modules to help it run. One works out how to hyphenate words, while another provides the spell checking facility and so on.

Most programs written in C use the SharedCLibrary, the ColourTrans module and, A typical !Run file that loads modules



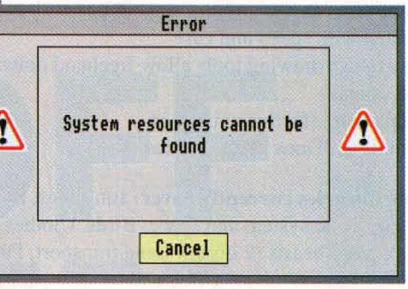
```
adfs::Piglet.$.MicroUser.Test.!AppName.!Run
|
| AppName !Run
|

Run <Obey$Dir>.!Boot

if "<System$Path>" = "" then Error 0 System resources cannot be found
RMEnsure SharedCLibrary 3.75 RMLoad System:Modules.CLib
RMensure ColourTrans 0.00 RMload System:Modules.Colours

WimpSlot -min 32k -max 64k

Run <appname$dir>.!RunImage
```



```
Tasks
Module tasks:
Task Manager
Filer
ADFS Filer
Resource Filer
Free
Palette Utility
Twilight
Menon
 Free in Module area   80K
       Largest block   29K
System memory allocation:
Screen memory         256K
Cursor/System/Sound    32K
System heap/stack      32K
Module area          1152K
```

The Task Manager relocatable module area and Task modules

That dreaded error message



```
Error
System resources cannot be
found
```

for programs

perhaps, the FPEmulator – the floating point emulation system. So RMEnsure allows you to check if a particular module has already been loaded. If it hasn't it executes a command, the syntax of which looks like this:

```
RMEnsure <moduletitle> <version number>
[<command>]
```

A typical example is:

```
RMEnsure SharedCLibrary 3.65 RMLoad
System:Modules.CLib
```

This command checks to see if the SharedCLibrary has been loaded and if it has, whether it's version 3.65 or better. If neither is the case, the command is executed.

The RMLoad instruction loads CLib from the modules directory inside the !System directory. But now, what if the newly loaded version of CLib is only 3.5? Attempting to run the main program is going to fail because the version is too old.

What's needed is another RMEnsure but this time a different command is used:

```
RMEnsure SharedCLibrary 3.65 Error You
need version 3.65 of the Shared C Library
or better
```

This generates an error with the text shown and the attempt to run the program is aborted.

System resources

There can be few Archimedes owners who haven't, at one time or another, seen the dreaded *System resources not found* error. Those not in the know will have probably thrown their hands up in horror wondering what on earth is wrong.

The root of this evil is derived from the need to load modules from the !System directory and another command found in nearly every !run file of a major application, IF. This has the syntax:

```
IF <expression> [then] <command> [[else]
<command>]]
```

This syntax is not quite the same as you'll get if you use *Help IF. This is right, the help information is wrong – otherwise you'd always have to use the word THEN and always have to include ELSE with another command.

When !System is seen by the Filer it creates a number of system variables, of which the most important is:

```
<System$Path>
```

If !System hasn't been seen this variable doesn't exist, using the IF command we can check for the presence of this variable to see whether we can access the system modules.

```
if "<System$Path>" = "" Error system
resources cannot be found
```

So now you know how *you* can upset new owners as well. This is the standard Acorn-approved error message. It would actually be more helpful to have something like:

```
if "<System$Path>" = "" Error !System
hasn't been seen yet
```

or:

```
if "<System$Path>" = "" Error Please find
!System then try again
```

However, most applications will continue to be unhelpful.

Each module will take up some memory in the machine and the situation can arise when a !run file might load half a dozen modules and then attempt to run the main program only to find there's not enough room.

This is inefficient and wasteful because it now means that memory is being occupied by modules that have no purpose. But it's possible to use the WimpSlot command as a rough guide to whether your program will run once everything as been loaded.

When your program is completed, add up the total space – including modules – that it will occupy. Then right at the start of the !run issue a WimpSlot that checks for the total memory available. If there's not enough the necessary error is generated.

The problem with this is that some of the modules might already be loaded because another program needed them earlier – or perhaps you're re-running an application you'd loaded earlier.

● That's the end of this short series. We've had a look at the elements needed to wrap around the core of an application and it's all fairly logical once you know what's needed – the actual program is your problem.

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Bricks and mortar from sprites and pixels

To finish his series, Steve Bruntlett looks at architectural design

ONE of my abiding passions is timbered buildings. Not the pale imitation Victorian ones, but the original Tudor halls, some of which could be taken apart and moved wherever their owners were heading next.

My favourite example is Little Moreton Hall in Cheshire. I tried to produce a drawing of the building six years ago using an early CAD program but it never really worked well enough so I was reduced to using a paint package.

This was straightforward but it didn't allow for the bent and twisted timbers to be drawn properly and the end result was far too regular for my liking and lacked character.

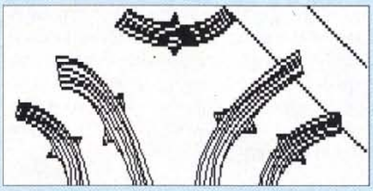
I visited Stokesay Castle with its restored timbered gatehouse in the original sand and natural timber colours – not the white panels and nasty black bitumened timbers seen so often – and resolved to produce a drawing of the gatehouse using the Archimedes.

One of the main problems with this kind of drawing is knowing when to finish. Looking at the monochrome and colour photographs I realised that I could spend weeks drawing the carvings on the doors, brackets and lintels of the gatehouse.

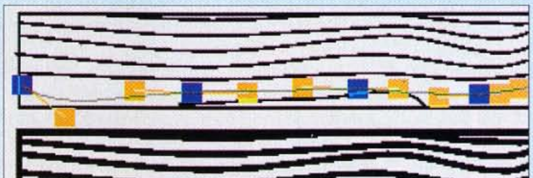
The acid test is how much you can actually see of the detail when printed out at the size you will be using. If it was to be an A4 laser printed high resolution image you would be able to see a tremendous amount of detail down to the oak pegs which hold the building together.

But if you plan a postcard-sized illustration produced on a dot matrix printer you'll see some of the woodgrain but not much carving. We'll be aiming for the latter, you can always add more at a later stage.

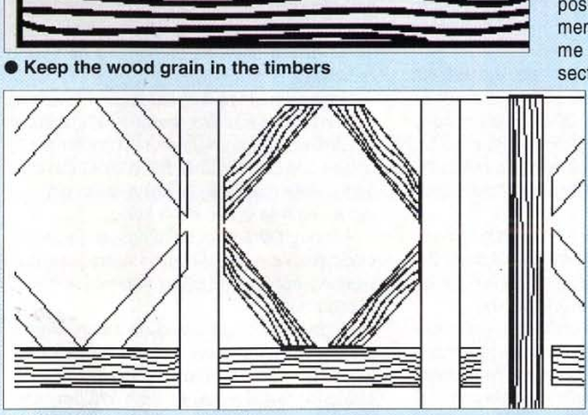
The main thing to remember is to start with a basic but accurately proportioned outline structure and work on the drawing section by section repeating drawn elements where possible.



● **Curved timber panel at the top of the gatehouse**



● **Keep the wood grain in the timbers**



● **Diamond panel construction**

The advantage of many buildings – including hand-built timbered ones – is that they use identical repeated elements such as bricks, tiles, panels and so on. So you can draw a few basic variations and develop or simplify these where necessary.

First of all produce a rough outline showing the positions of the basic elements of the drawing. For me these were the lower section, the upper storey, the roof and the window structure. I produced the outline by setting up a landscape A4 DrawPlus page with Zoom set at 3:5 and holding the photograph of the castle at the side of the screen to judge the size and proportion.

The outline can be measured from the photograph and drawn accurately on screen if *show screen grid* is switched on and you have a screen setting of 0.5 mm on the Grid control panel and a Lock setting of 10 times the screen setting. This gives discrete movements of 0.5mm which is small enough to start with.

The best approach is to regard it as a construction kit which seemed to tie in with the way the gatehouse had been built. I drew a single section of timber which I used for all horizontal and vertical beams as well as the doors.

I modified it to a beam with a bevelled end for one of the main timbers and drew a more complex section of timber at 45 degrees for the barge boards, a simpler section with angled ends for the diamond-shaped decorative panels, a single curved section of timber for the more complex decorative panels, a semi-circular section under the extended window and an arched piece to go over the passage.

Flipping and rotating

There are only half a dozen different sections of timber in the whole drawing. The apparent variation is due to flipping or rotating sections of timber which have been scaled to fit different locations and treated with differing line thicknesses depending on their size.

I was tempted to make everything flush but this didn't work, so I redrew most of the elements with a solid white fill panel at the back so that they could be overlapped or overlap without parts of the element underneath being visible.

The diamond shaped panels were constructed from four diagonal sections of timber made slightly irregular by rescaling. I made the panels slightly larger so that the edges were

➤

definitely hidden once the vertical and horizontal timbers were overlapped too.

The timber originally used in this type of building would vary in thickness and type so a little irregularity here and there adds to the effect. The curved sections would have been sawn from curved branches but this gatehouse was built in the 15th century when builders had started cutting from flat timber.

Next I put the main structural timbers over the outline. You should print out your drawing at this stage to see what degree of detail is visible to save unnecessary work.

The beams should be a fairly solid black to look the same as the photo but I kept the line thicknesses sufficiently thin to show the wood grain. This has to be judged according the degree the timber has been widened or shortened, and by trial and error you can get a reasonable effect.

Once a section of the main structure was complete – the left hand section of diamond shaped panels – I grouped them so that they could be moved easily and I could change the line thickness in one go rather than having to alter each element separately.

I didn't draw the right hand side but copied and flipped the left hand side and dropped it into place. You can always ungroup one side and move a few bits round to make it look a bit different.

I don't regard copying and flipping as cheating so that's how I produced the roof and the lower section. The roof is symmetrical but the lower part of the gatehouse has a window added at one side which is itself a copy of the window in the triangular roof section.

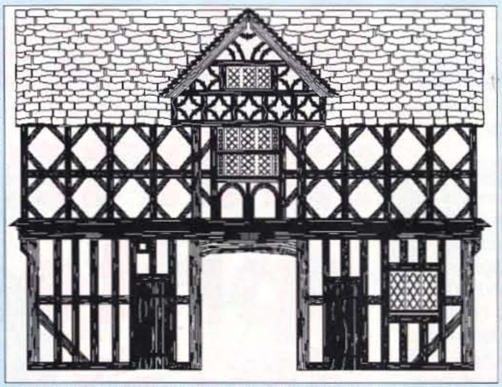
The windows all use the same basic pane constructed with sections of leading or grey rectangular strips of different lengths rotated accurately to 45 degrees. Once rotated these were flipped vertically and horizontally and moved into position.

The main problem is that if the rotated strips are too long you can't shorten them without changing their width. You have to draw another one a bit shorter or longer until you find one that fits. The frame hides the overlap so they don't have to be millimetre accurate.

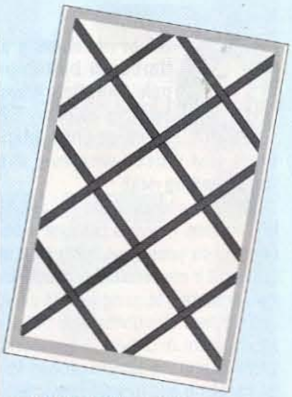
I didn't design the window in situ but drew a rectangle to fit the space, moved it into a clear part of the drawing to work on and then dropped the grouped window into place once drawn. It's much easier to group and ungroup components on a blank part of the screen.

I had to decide early on if this was to be a copy of a photograph with its perspective effects or whether it was to be an architectural elevation. I chose the latter because it's easier to draw and gives a clearer view of the structure and detail of the building.

The other decision I had to take was whether to include the carved figures on the vertical beams on the sides of the window, the carved arches in the panels underneath the bay window and the beautifully carved barge boards above the smaller top window.



● **Restoring the gatehouse to former glory**



● **The latticework can be a bit tricky**

I decided to skip these but I plan to add them later. I might try scanning some black and white photos, reducing the scans and adding these but I suspect they won't look as good as hand-drawn carvings, though it would be about a hundred times quicker.

Another important decision to make is how you're going to draw all the timber peg holes used in the construction. It's easier to draw them in a single component which will be repeated rather than having to add them to 50 or 60 separate elements. I decided not to bother at all as you wouldn't be able to see them at the scale I'm intending to print.

> *There are only half a dozen different sections of timber in the whole drawing*

Once a section has been assembled you can use *backward, back, forward* and *front* to make sure all the pieces overlap correctly. This is straightforward with the panelling as elements of the panels and timber framing are either at the front or the back.

But if you take out a section of roof tiles for editing, for example, you'll have to use *backward* or *forward* as many times as there are tiles above or below to move it back into place. So if it won't go straight back just keep going until it does.

The roof tiles were drawn as boxes with the edges turned to curves and pulled out of shape a bit. I drew five different tile shapes and then grouped them in rows in different combinations and orientations using two of the rows alternately and varying their appearance by flipping.

All the rows were originally the same length, I just extended the top ones to go behind the triangular roof section so some look a bit clumsy. I'll change them at a later date.

The edges of the tiles on the triangular roof section were tricky. I drew a solid black rectangle and rotated it to 20 degrees, copied and stacked four or five along the 45 degree roof section. By grouping them and I repeated them until just below the top where I drew a V-shaped separate tile.

It's easier to draw the barge boards as symmetrical objects and as they would have probably been split from a boxed log and used as a matched pair originally this looks quite authentic.

The problem with the building is that it looks too regular – the timbers are too rectangular and the whole thing looks as though it's just been built which I suppose it has in a way.

Using DrawBender on some sections would give a bit of distortion here and there to give sagging timbers and a wonky roof.

But the gatehouse has a relatively recent roof which is perfectly horizontal and begs the question: What does an authentic timbered building look like – should it be drawn as if it was new, in a state of collapse or restoration?

A couple of tips to finish. If you're trying to group objects from only part of the drawing group them from the edge of the *paper* or save your work, delete the objects in the way, group what is needed and save it as a selection.

Then load your original drawing and then your selection at the bottom left hand corner. You should find it near its original position.

The second tip is to reduce the amount of drawing visible by using the window sliders if you are doing lots of detailed work – to cut down on redrawing time. Even changing the scale of the drawing involves a complete redraw.

Bring up the menus at the edge of the drawing window for a similar reason. My final drawing takes 22 seconds to redraw on a full screen and that's with Arm3. Without this chip it takes one minute so anything which reduces redrawing time is well worth trying.

Although drawing buildings might seem complex it's a matter of thinking logically, working out the structure and sequence of construction.

Modern buildings could be easier than a mediaeval gatehouse but not necessarily. Whatever you do, start off with something straightforward – rather than Westminster Abbey.

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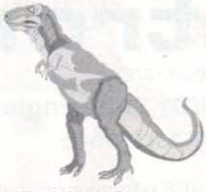
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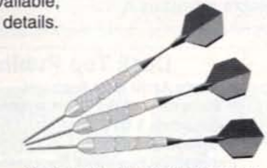
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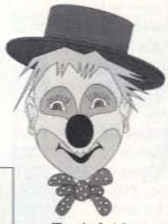
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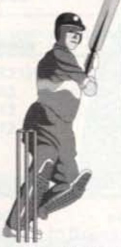
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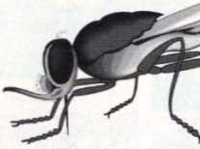
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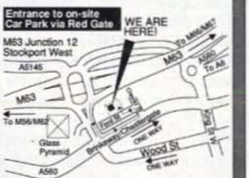

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The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

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ADA 0570	200Mb	15mS	£479
ADA 0580	330Mb	15mS	£849

All the above 3.5" hard drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting). For use with A300/A400/A500 series machines.

For A3000 users an additional external Case and PSU will be required.

AAA 0300 External Case & PSU for A3000	£85

Internal Hard Disc Drives for A3000

State of the art, 4 layer internal IDE Hard Cards for the A3000. Software supplied in, On-board ROM.

ADA 0700	21Mb	23mS	£185
ADA 0770	30Mb	19mS	£285
ADA 0720	44Mb	19mS	£349
ADA 0750	60MB	18MS	£399
ADA 0730	89Mb	18mS	£619

Supplied ready assembled. No soldering required. Simply plug into the allotted space.

Archi IDE Hard Cards

"Simply plug and play"

Watford's easy to instal, low cost, high performance, revolutionary IDE Hard Cards for the A300 & A400 series Archimedes.

ADA 0650	21Mb	23mS	£199
ADA 0800	30Mb	19mS	£295
ADA 0660	44Mb	28mS	£359
ADA 0810	60Mb	18mS	£409
ADA 0670	89Mb	18mS	£629

(Can be used as a Removable Hard Drive)

NEW

Archimedes A300/A400 SCSI Hard Disc Offer

(while stocks last)

100MB Hard Disc Upgrade complete with Controller card, Cables, Formatter and Manuals

RRP: £799

Offer Price: £325

Syquest Removable Disc Units

These Hard Drive units are supplied complete with a cartridge 42Mb removable, cables and a high flow fan for cooling.

• Syquest Drive Unit pack	£399
• As above + SCSI Card	£415
• Spare 42Mb Disc	£55

Archi to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.

New RISC OS Version also available (please specify)

• For A3000 **£15** • For A5000 **£16**

For A3000 Serial Upgrade **(£19)** required

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£399**

FREE with every BBC Master purchased from us during August

A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER

Add-Ons & Accessories

Econet Module for the Master		£42
Twin ROM Cartridge for Master		£9
Quad ROM Cartridge for Master		£14
Master Reference Manual I	(No VAT)	£14
Master Reference Manual II	(No VAT)	£14
Master Advance Ref Manual	(No VAT)	£14
64K Upgrade Kit for B+		£32
Acorn 1772 DFS Kit complete		£49
ECONET Upgrade Kit for BBC B		£42
ALL ECONET UPGRADES Available		
ARIES' IEEE Interface for BBC B & Master		£238
Morley Teletext Adaptor with ATS Rom		£99
Ecolink		£270

Minerva's Archimedes Software

EasyWord	£18	Time Tabler	£549
Home Accounts	£35	System Delta	£59
System Delta Program Reference Manual			£29

Stand alone Business Accounts Packages

Sales; Purchase; Order Processing and Invoicing; Nominal; Stock management

£79 per module

or Complete Business Package **£325**

ARM 3 Turbo Card MkII

Simply The Best

Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £169. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.

Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £18.

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

RRP £249

Offer Price £169

Acorn have satisfactorily evaluated Watford's ARM 3 upgrade and the A3000 upgrades are fitted by Acorn approved surface mount technology centre, therefore its fitment will not invalidate Acorn's warranty on the micro.

Z88 Portable Micro

• Z88 Portable Micro	£179
• 32K RAM Pack or 32K EPROM Pack	£16
• 128K RAM Pack or 128K EPROM Pack	£32
• 512K RAM Pack	£86
• 256K Eprom Pack	£55
• Z88 Eprom Eraser Unit	£38
• Z88 Carrying Case	£8
• AA Nicad Rechargeable Battery	£1.50
• Battery Charger Compact & Fast	£6
• Z88 Serial Printer Cable	£8
• Z88 Parallel Printer Cable	£18
• Z88 to Archi Link	£15

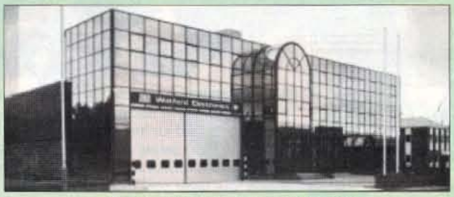
• Z88 to BBC Link	£8	• Z BASE	£56
• Z88 to PC Link II	£27	• Z88 to Macintosh	£32
• Z88 Mains Adaptor	£9	• Z88 Modem	£114

Continued→ → → → → → → → →

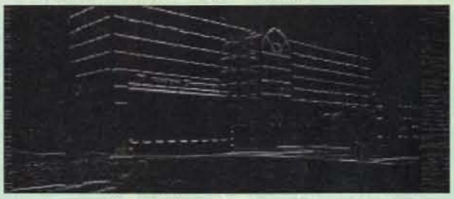
SCANNING ON THE ARCHIMEDES WILL NEVER BE THE SAME

"The image quality which this little beauty can produce is quite stunning."
Archimedes World – July 1992

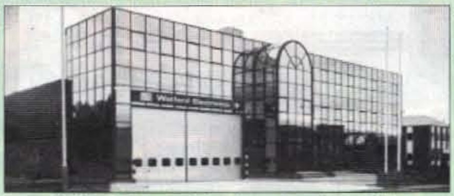
"Other Arch image grabbers have been irritating or just plain useless..."
"Loads of well written, easy-to-follow and in-depth help, all glued together in a very handsomely designed manual."
Computer Shopper – July 1992



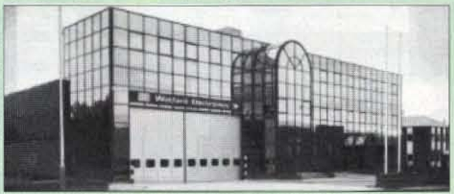
Original Image, 16 Grey Levels



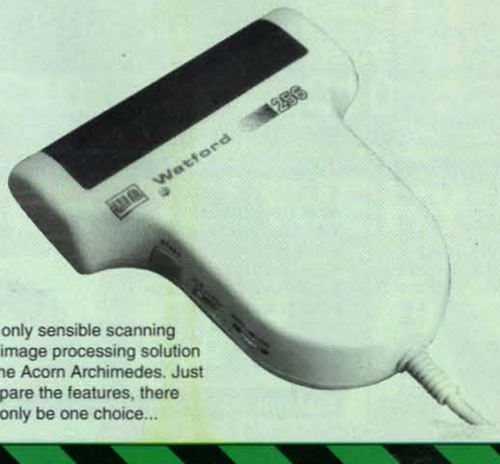
Original after edge filter applied



Original after applying an enhancement filter



Original after applying a smoothing filter



The only sensible scanning and image processing solution for the Acorn Archimedes. Just compare the features, there can only be one choice...

Watford proudly introduces its innovative new 256 grey-level hand scanner, **Scan256,** for the Archimedes range of micro computers. It offers up to 256 grey levels at a maximum of 400 dpi, and comes complete with the most advanced and sophisticated 256 grey scale scanner software currently available for the Archimedes.

Features

- **Multiple copies of the image in memory at once**
  Allows multiple consecutive operations without having to save the original image to disk.
- **Instant re-draw of all 4 image buffers**
  No re-calculations needed unlike other packages that use on the fly screen-dithering.
- **Highly advanced dithering and image size reduction**
  Available via industry standard ChangeFSI package for maximum image quality. An invaluable aid to reduce the size of the image whilst maintaining maximum image quality.
- **Advanced in-built image processing options**
  Convolution digital filtering fully implemented with over 100 filters covering edge detection, image enhancement and image smoothing. Enables high quality images to be obtained from poor quality scans.
- **A unique L.E.D. indicator on the scanner**
  Shows you when the scanner is being moved at close to the maximum scanning speed, not just when it is too late and a scan line has been missed by moving the scanner too fast.
- **Fully adjustable scale and size of image preview when scanning**
  Image preview window can even be behind other windows and preview is shown in real-time with maximum number of grey scales available.
- **Support for 'The Serial Port' Graphics Enhancer**
  Allows up to 256 simultaneous grey scales on screen at once.
- **True brightness, contrast and gamma correction**
  All can be specified by a value to exactly match monitor/printer. No guessing with shapes of curves and correction is mathematically correct.
- **RISC OS 3 features**
  Include rotation and shearing. Scans normally are scanned at a slant rather than being rotated, shearing enables the scan to be corrected better than rotation.
- **Fast RISC OS printing**
  Multiple options such as scale to page, centre, sideways, selected area, and any scale.
- **Scanner scans at an amazing 3ms per line**
  A post card at 400dpi takes only 7.3 seconds to scan, creating over 3Mb of data.
- **Selectable scanning modes**
  256 grey-scale, 256 grey-scale half width, 16 grey-scale and monochrome scanning modes. Half width mode enables longer 256 grey-scale scans to be achieved.
- **Save image in foreign formats**
  Save as industry standard TIFF for exporting to other systems, AIM for further processing, or RISC OS Sprite format.
- **Single width, high quality podule using surface mount technology**

Scan256 Scanner, Interface Card,
Software and Manual

Only £185

BBC Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs £20.00
- Maths with a Story 2 (Disc). 4 further maths programs. £20.00
- Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs. £17.00
- Computers at Work – Primary £17.35
- Espana Viva – 3 Discs £19.95
- WHITE KNIGHT Chess game £16.00
- A Vous La France £29.00
- Six French Games – Aimed at pupils in their first year of French, but also useful as revision for more advanced students 11 years+ £26
- More French Games – Another 6 games 12 years+ £26
- Au Restaurant and Accident de Route 12 years+ £26
- Boulogne and Oh-Les – 2 programs for beginners £26
- Letters to French Penpals – 11 years+ £26
- French Programs with Henri Beret – The programs in this series present vocabulary, grammar and role-play phrases in the form of animated games. 11-16 £22
- Six German Games – Aimed at pupils in their first year, but useful as revision for more advanced student of German. 12 years+ £22
- More German Games – Aimed at pupils in their 2nd year of learning German. 12 years+ £22
- Computer Control – This is a package of 3 programs simulating control of a greenhouse, a robotic arm & a chemical plant. 14-16 years £26
- PUNCMAN Learning punctuation
  - Puncman 1 & 2 for 7 – 13 years £15
  - Puncman 3 & 4 for 8 – 14 years £15
  - Puncman 5, 6 & 7 for 8 – 15 years £15
- Yes Chancellor – A chance to take over number 11 at Downing Street. 12 years+ £18
- Letters & Pictures – Introduces phonic skills to Infants 6-8 years £15
- Numbers & Pictures – Early number learning is a great fun (4-6 years) £15
- Note Invaders – Budding musicians can learn the notes on the Clef with this elegant game 3 programs (7 to Adults) £15
- Maps & landscapes No. 1 (9-14 years) £18
- Help Your Child learn Basic Map work No. 2 (9-14 years) £18
- Spelling Week by Week (6-14 years) £18

Archi Educational Software

• Animated Alphabet (3-6 yrs)	£21
• Arcventure (8-12 yrs)	£29
• Bookbinder	£43
• Bumper Disc	£14
• Bumper Disc 2	£14
• Craftshop 1	£26
• Craftshop 2	£26
• Converta-Key	£16
• Data Word	£16
• Desktop Stories	£35
• DigiSim	£35
• Dream Time (5-7 yrs)	£23
• Farm (5-7 yrs)	£19
• Fleet Street Phantom (9-13 yrs)	£25
• Fun School 3 Red (up to 6 years)	£17
• Fun School 3 Green (6-8 years)	£17
• Fun School 3 Blue (8 years +)	£17
• Gate Array Teaching System	£68

• Glimpse Clip Art Utility (7-16 yrs)	£8
• Highlighter (6-16 yrs)	£42
• Jigsaw	£28
• Mapventure (9-13 yrs)	£24
• Microbugs	£24
• Money Matters	£16
• Nature Park Adventure (7-9 yrs)	£27
• Numerator	£60
• Picture Book	£16
• Recall (6-13 yrs)	£39
• Sellardore Tales	£24
• Snippet	£26
• Space Mission Mada (9-13 yrs)	–
• Sting of the Dump (9-13 yrs)	£22
• Target Maths	£16
• Viewpoints (9-12 yrs)	£33
• Wizard's Revenge (7-10 yrs)	£17
• Worst Witch (7-10 yrs)	£25

Archimedes Software

GRAPHICS	
3D Construction Kit	£39
Arc Light	£46
ARCtist	£19
ARCticulate	£19
Atelier	£65
Artisan II	£45
Artisan Gallery	£16
Autosketch II	£65
Craftshop 1 & 2	£28
Euclid 2	£50
Graph Box	£59
Graphbox Professional	£107
HotLink Presenter	£40
Illusionist	£69
Kermit	£46
Mogul	£17
Poster	£79
Pro Artisan	£70
Prime Art	£69
Render Bender 2	£95
Revelation 2	£80
Snippet	£21
Titler	£119
Tween	£29

GAMES	
Air Supremacy	£17
Apocalypse	£14
Arcade Soccer	£14
Avante Garde Fonts	£23
Boogie Buggy	£14
Break 147 + Supa Pool	£19
Bughunter in Space	£13
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Chocks Away 2	£14
Chocks Away Extra	£14
Conqueror	£15
Corruption	£18
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Enter the Realms	£19
E-Type Compendium	£20
E-Type Designer	£13
Family Favourites	£13
Grievous Bodily Arm	£19
Holed Out Designer	£13
Holed Out Golf Comp	£20
Hostages	£14
Inter Dictor 2	£26
Iron Lord	£15
Jigsaw	£27
Lemmings	£20
Lost Temple	POA
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Masterbreak	£16
Man at Arms	£14
MahJong Patience	£15
Manchester United Europe	£19
Mig 29	£24
Nebullus	£21
Nevryon	£14
Olympics	£14
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Pipe Mania	£17
Power Band	£14
Puncman 1 & 2	£16
Puncman 3 & 4	£16
Pysanki	£14
Quazer	£10
Real McCoy	£22
Real McCoy 2	£23
Redshift	£14
Return to Doom	£16
Repton 3	£14
Saloon Cars Deluxe	£27
Spitfire Fury	£22
Splice	£25
Sporting Triangles	£24
Superior Golf	£14
Superpool + Break 147	£19
Swin	£22
Talisman	£12
Timewatch	£24
Trivial Pursuit	£22
Twin World	£15
U.I.M.	£23
White Magic 2	£15
Wimp Game	£13
Worldscape	£16
XFire	£19
Zelanites	£23

Miscellaneous	
Ancestry	£59
Arccomm 2	£38
Arcterm 7	£64
Armadeus Sound	£60
BBC DFS Reader	£6
Broadcaster Loader	£65
Compression (CC)	£38
Equasor	£38
FlexiFile	£97
Genesis Plus	£68
Genesis 2	£99
Investigator 2	£22
JX Archi Colour Printer Driver for Citizen & Star Printers	£15
Magpie 2	£42
Notate	£42
Numerator	£66
Pin Point	£65
Presenter 2	£29
Presenter Story	£145
Rainforest	£17
Revelation 2	£95
Rhapsody in Blue 2	£45
Score Draw	£46
Show Page	£127
Speech!	£15
SWIV	£19
The Victorian	£17
Time Tabler	£549
Toolkit (Clares)	£35
Touchtype	£40
Tracker	£39
Turbo Driver BJ10E	£42
Vox Box	£46
WorldScape	£17

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77 £77 each
Assembler; LISP; Prolog X £149 each

ANSI C Rel. 3	£125	Logotron Logo	£45
Macro Assembler	£40	Risc Basic	£120
Robo Logo	£69	Risc FORTH	£110
BASIC Compiler	£77	Cambridge Pascal	£95

Archimedes External Disc Drive Interface

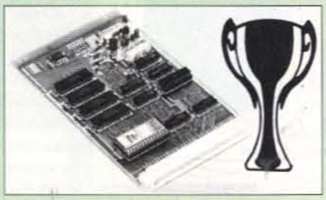
With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead.

Price £21

Back Plate Extension

• A300/400 £15; • A300 £14

Archi Real-Time Digitiser



Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £119

A Set of Colour Filters for colour image grabbing using a video camera £16

Archi Graphic Tablet

The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).

(FREE this month, PC Mouse Drivers & Art package)

Special Price £199

(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£20**

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus £125

Surge Protector Plug

Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage translent spikes/surges caused by lightning or thermostats switching.

Protection for only **£8.50**

4 Way Mains Distribution Socket

4 way top quality mains trailing sockets.
Supplied wired up with mains plug ready for use.
Can be screwed to floor or wall if required.
Very useful for tidying up all the mains leads from your peripherals.

£9.50

Aries Spike Cleaner Unit

A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete Computer/Hi-Fi System

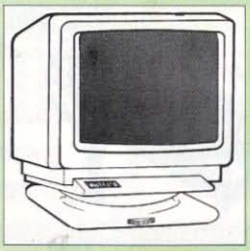
£16

8 Way DIP Switch

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ keyboard

Only **£1.00**

Continued→ → → → → → → → →



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Connecting
lead with
every monitor
purchased
from us.
Please specify
type required.

Microvitec Monitors

• **1431** – Standard Resolution Monitor	£169
• **1451** – Medium Resolution Monitor	£209
• **Cub3000** Medium Res for A3000	£189
• Dust Cover for Microvitecs	£5.50
• **Touchtec 501 Touch Screen**	£239

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

• Eizo 9060S	£389	• Taxan 770LR	£362
• Eizo F550i	£719	• Taxan 775	£362
• Eizo T560i	£995	• Taxan 787	£249
• NEC 3FG	£370	• Taxan 795	£397
• NEC 4FG	£465	• Taxan 875	£679
• NEC 5FG	£850	• VIDC Enhancer	£25
• NEC 6FG	£1525		

Aries AlphaScan Monitor

Pound for Pound, the AlphaScan VGA Multiscan monitor provides the maximum performance and greatest flexibility of any 14" colour monitor for the Archimedes micro.

Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The Multivideo VIDC Adaptor supplied (free) with the monitor allows high resolution operation in all screen modes.

£325

Philips Monitors

• **BM7502** 12" Hi-res Green Monitor	£67
• **CM8833** 14" Med. Res Colour Monitor	£172
• Dust Cover for Philips Monitors	£6

STAR BUY

Aries A2000 Colour Monitor

This attractively finished, etched screen medium res monitor is supplied complete with built-in speaker, volume control and video input. All controls are located on the front panel for ease of use. Ideal for BBC, BBC Master, Archimedes and Amiga.

Only £159

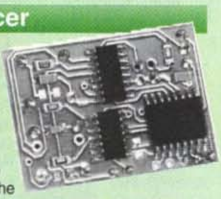
Spare Monitor Leads

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

Roland Plotters

• DXY1100	£490	• DXY1200	£620
• DXY1300	£825	• DXY2500	£2345
• Sketchmate A3	£499	• Sketchmate A4	£308
• Roland plotter Pens, Fibre tip	£7.50		

VIDC Enhancer



This unique VIDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A Desk Top application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: Its unique design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control **£45**

MultiVideo VIDC Card: As above but for MultiScan monitors only. **£25**

Panasonic Printers

KX-P1123	£126	KX-P2180C	£156
KX-P1124i	£170	KX-P2123C	£198
KX-P1170	£99	KX-P2180M	£159
KX-P1624	£270	KX-P2123M	£176
KX-P1654	*£332	Colour Kit for P2180M/2123M	£–
KX-P1695	£270		
KX-P2624	*£270		

*** Price includes 12 months On-site warranty**

Cut Sheet Feeders

P36 – 1124/24i	£79	**P37** – 1123/70/80	£69
P38 – P1624/95; P2624			£129

Buffers

P12 4K Buffer Board for KX-P1081	£55
P14 32K Buffer P1123/24/70/80 P1540/92/95; P1624/54/95	£16

Serial Interfaces

P19 for P1123/24/24i/70/80/1624/54/95/2624	£49

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595			£6
P115 for KX-P1180	£7	**P145** for KX-P1124	£7
P140 for KX-P1540	£8	**P155** for KX-P1624	£8

Colour Ribbons for KX-P1081, 1592 & 1595
Brown, Blue or Red **£9 each**
P150C Colour for P2123/2180 £15

Citizen Printers

• 120D Plus	£95	• Swift 24E#	£225
• 224	£174	• Swift 24X	£299
• PN-48	£199	• 24X Colour Opt	£32
• Swift 9	£145	• PN48 Ribbon	£4

• AH29804 Manual Cut Sheet Feeder for Swift 9/24/124. Holds 50 Sheets £29

# FREE Colour Option with Swift 24E
+ FREE 2 years Parts and Labour warranty on all Citizen Printers

• Swift 9 Colour Option		£19
• Swift 24 Colour Option		£29
• Swift 24 Ribbons	Black £4	Colour £13
• Swift 24X Ribbons	Black £8	Colour £16
• Citizen/Archimedes Colour Printer Driver		£15

Integrex Ink Jet Printers

• Colour Jet 132 Printer	£449
• Paper Roll	£6.50
• BBC Screen Dump Software	£10
• Colour Cartridge	£21
• Black Cartridge	£12.40
• 100 A4 OHP transparencies	£55
• 8K Serial Interface Optional	£123
• Colour Jet 2000	£POA
• Betajet Ink Jet Printer	£275

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 250234 or 233383

Star Printers

LC15	£178	SJ48 Inkjet	£172
LC20	£105	XB24-200 Colour	*£295
LC24-15	£245	XB24-250 Colour	*£355
LC24-20	£158	XB24 Colour kit	£29
LC24-200	£170	ZA200 Colour	*£244
LC24-200 Colour	£205	ZA250	*£310
LC200 Colour	£143		

• Star/Archimedes Colour Printer Driver £15

* Includes 12 months On-site warranty

Cut Sheet Feeder

LC10/200/24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139

Serial Interfaces

8K Ser	LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15	£52

Buffers

32K Ram Card for LC/XB24-10; 15; LC200	£55

Ribbons

LC10; LC10-II; LC15	Black £4;	Colour £6
LC-200; LC24-200	Black £5;	Colour £12
XB24-10; XB24-15	Black £5;	Colour £12

Laser Printers

All Laser Printers include 12 months On-site maintenance

Brother HL-4	4ppm	£575
Brother HL4-V	4ppm	£640
Brother HL4-PS Postscript	4ppm	£1040
Brother HL8-V	8ppm	£990
Canon LBP4 LITE	4ppm	£495
Canon LBP4+ 1.5M RAM	4ppm	£639
Canon LBP-8III Plus	8ppm	£960
Epson EPL4300	4ppm	£635
Epson EPL4000	6ppm	£485
Epson EPL7500	6ppm	£1145
Epson EPL8100	10ppm	£960
HP Laserjet IIP+	4ppm	£525
HP Laserjet III	8ppm	£1010
HP Laserjet IIID	8ppm	£1495
HP Laserjet IIIP	4ppm	£685
HP Laserjet IIIsi	16ppm	£2515
NEC Silentwriter S62P P/script	6ppm	£1070
NEC Silentwriter 266	8ppm	£670
NEC Silentwriter 290P P/script	8ppm	£1389
Panasonic KX-P4420	8ppm*	£618
Panasonic KX-P4450i*	11ppm*	£915
Panasonic KX-P4451		£1240
Panasonic KX-4455 Postscript	11ppm*	£1450
Panasonic KX-P4430 Satin Print*	5ppm*	£627
Panasonic KX-P4410	5ppm*	£–
Star LP-8 III 2	8ppm	£1249
Star LP-8 III	8ppm	£905
Star LP-8 Star(post)script	8ppm	£1135
Star LP-4	4ppm	£565
Star LP-4 Mk 3	4ppm	£649
Star LP-4PS Postscript	4ppm	£775

* Now with 2 years On-site warranty

Laser Toners

Canon 2, 3 & 4	£46	Star LP4/LP8	£56
Epson GQ	£13	KX-P4420/50	£19
EPL 4100	£59	Laserjet HP IIP & IIIP	£42
EPL7100/7500/ 8100	£125	Laserjet II/D, III/D	£48
		Qume Crystal (3)	£58

Laser RAM Upgrades

IIP; III/P 1Mb	£51	EPL7100 256K	£39
IIP; III/P 2Mb	£88	GQ5000 512K	£42
IIP; III/P 4Mb	£135	KX4420/50 1M	£75
II & IID 1Mb	£64	KX4420/50 2M	£115
II & IID 2Mb	£99	KX4420/50 4M	£195
II & IID 4Mb	£146	Star LP8 1M	£139
Canon LBP4 1M	£105	Star LP8 2M	£275
Canon LBP8 2M	£125		

Laser Drum & Developer

• Epson Drum	GQ5000	£93	EPL7100	£129
• Panasonic 4420 Drum		£60	Developer	£59
• Panasonic 4450 Drum		£93	Developer	£80
• Qume Drum		£76	Developer	£56

Jetpage Postscript Cartridge

• HP IIP/III	£225	IID & IIID	£227

Various Add-Ons

• Laserjet Appletalk Interface	£135
• HP Adobe Postscript	£399
• Pacific Page Postscript	£259
• HP Premier Font Collection	£28
• Laserjet various Font cartridges	from £45

Hewlett-Packard Printers

# Desk Jet 500	£272	*Paintjet XL 300	£1785
Desk Jet 500 Col.	£399	*Quiet Jet Plus	£382
*Paint Jet Colour	£518	*HP Think Jet	£265
*Paintjet XL	£1196		

3 years extended Parts & Labour warranty £49
* Price includes 12 months on-site warranty

- DeskJet 500 Cart. Black **£15;** Colour **£27**
- Paintjet Cartridges Black **£19;** Colour **£23**
- Desk Jet 500 256K RAM cartridge **£69**
- HP Epson FX Emulation Cartridge for Desk Jet **£59**
- DJ 500 High Capacity Black Cartridge **£21**
- DJ 500 Colour Archi Printer Driver **£15**

Plug In Font Cartridges for DJ 500

- 22706B – Prestige, Elite, Line Draw fonts **£55**
- 22706C Letter Gothic & HP Line Draw fonts **£56**
- 22707P – Proprint Emulation Cartridge **£57**
- Desk Jet Unlimited (Book No VAT) **£19.75**

Canon Bubblejet Printers

	Printer	CSF	D'ble Bin	Ink Cart
BJ10EX	£174	£43	–	£16
BJ20	£254	–	–	–
BJ300*	£284	£88	£65	£12
BJ330*	£380	£110	£79	£12
BJC800C	£1411	–	–	–

* Includes 12 months On-site warranty

- Spare Battery pack for BJ10E **£33**
- BJ10EX – Archi Turbo Driver **£42**

Special Offer:
Canon BJ10EX Printer + CC's Turbo Driver **£222**

NEC Pinwriter Printers

• P20	£178	• P70	£396
• P30	£237	• P90	£605
• P60	£322		

- P60/70 Colour Option Kit **£59**
- Ribbons Black for P20/30 **£6** for P60/70/90 **£7**
- Ribbons for P60/70/90 Black **£9** Colour **£13.50**

Cut Sheet Feeders
P20 **£59;** P30 **£85;** P60 **£89;** P70/90 **£80**

Epson Printers

DFX5000	£1075	LQ1070	£310
DFX8000	£1940	LQ1170	£432
FX850	£258	LQ2550+	£675
FX1050	£327	LX400	£100
LQ100	£147	LX850+	£138
LQ200	£161	LX1050	£206
LQ570	£201	SQ870	£POA
LQ860 Colour	£440	SQ1170	£565
LQ870	£357	SQ2550	£625
LQ1060 Colour	£585		

Cut Sheet Feeders for

LQ570, LQ870 **£47**
LX400/850/LQ200/400/450/500/550 LQ1010/1070/1170 **£72**
LX1050 **£115** FX850/LQ860 **£128**
FX1050/LQ1060/SQ850 **£155**
LQ2550 **£299** SQ2550 **£210**

Tractor Feed for

LQ800 **£44;** LQ850/FX850 **£69;** LQ1050/FX1050 **£85;** LQ2500 **£90;** LQ2550 **£90.**

Accessories

- EX800/1000 Colour Option **£45**
- EX800/1000 Colour Ribbon **£14**
- LQ2500 Colour Option **£65**
- Multifont Card for LQ550/850/1050 **£95**

Epson Printer Interfaces

RS232 **£28** RS232 + 2K Buffer **£52**

Printer Leads

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Nimbus Centronics Lead	£6
IBM/Archimedes Parallel Lead 6'	£5
IBM/Archimedes Parallel Lead 5 metres	£10
IBM/Archimedes Parallel Lead 10 metres	£15
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
RS232 Leads (Various)	P.O.A.

Laser Direct

- Special High Res Card 600 DPI for Canon LPB 4 & LPB 8 Laser Printers **£315**
- LPB 4 Printer plus High Res Card **£875**
- LPB 8III Printer plus High Res Card **£1275**
- LPB 4 Optional Paper Tray **£79**

Fujitsu Printers

B-100	£205	DL1100 Col	£267
B-200	£270	DL1200	£363
DL-900	£181	DL3600	£508
DL1100	£217	VM800	£1036

Ribbons

DL900/1100/1200	Mono	£5	Col.	£11
DL3600	Mono	£6	Col.	£12

B-100/200 Ink Cartridge **£15**

Concept Keyboards

Standard A3 Keyboard with BBC Software	£138
Standard A4 Keyboard with BBC Software	£109
Archi A3 Keyboard	£139
Archi A4 Keyboard	£110

Listing Paper (Perforated)

- 1,000 Sheets 9.5" x 11" Fanfold Paper **£7**
- 2,000 Sheets 9.5" x 11" Fanfold Paper **£11**
- 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold **£21**
- 1,000 Sheets 15" x 11" Fanfold Paper **£9**
- 2,000 Sheets 15" x 11" Fanfold Paper **£16**
- 1,000 Sheets true A4 Fanfold Paper 70gms **£11**
- 2,000 Sheets true A4 Fanfold Paper 70gms **£21**
- Teleprinter Roll (Econo paper) **£4**

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 off, 90 x 36mm (Single Row)	£6.00
1,000 off, 90 x 36mm (Twin Row)	£6.25
1,000 off, 90 x 49mm (Twin Row)	£7.50
1,000 off, 102 x 36mm (Twin Row)	£6.75

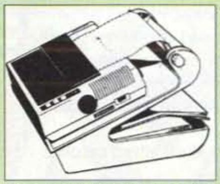
Laser Printer Labels on A4 Sheets

3750 off, 70 x 29mm (3 Rows)	£15.50
2400 off, 70 x 37mm (3 Rows)	£15.25
2625 off, 70 x 42mm (3 Rows)	£15.00

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£2.75	£4.50
DMP2000	£2.75	£4.75
DMP4000	£3.75	£4.85
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£4.00	–
LX80/86	£2.75	£4.50
LX400/800/850	£3.50	£5.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00
Panasonic KX1080/81	£6.00	£5.00
Panasonic KX-P1124	£7.00	£5.00
Star LC24-10	£2.95	£6.00

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3)
132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 printers to 1 Micro with our combined, Sharer/Changer switch boxes.

Standard Low Cost Type

Connects	Serial	Parallel
• 2 to 1	£10	£11
• 3 to 1	£13	£14
• 4 to 1	£16	£17

Professional Type

Connects	Serial	Parallel
• 2 to 1	£17	£18
• 3 to 1	£22	£25
• 5 to 1	£34	£38

Cables extra at £6 each

2 Way Compact Switch

A handy 2 way printer switch can be attached to the micro or monitor for ease of use.
• Centronics **£18;** • Serial **£17**
(Cables extra at £6 each)

Auto Printer Sharer Switch

Cross Over Manual Switch	
2 In/2 Out Parallel	£29
2 In/2 Out Serial	£28
3 In/2 Out Serial	£36

256k Multi Spooler

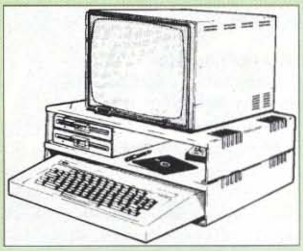
These Auto Parallel Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

- 2 In/2 out **£135** • 4 In/2 out **£169**
- 8 In/1 out **£199**

Compact Converter Units

Serial to Parallel **£36** Parallel to Serial **£37**

Plinths for the BBC B, BBC Master & A3000

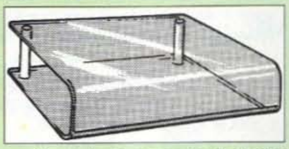


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

• Single BBC Plinth	420 x 310 x 105mm	£13
• Double BBC Plinth	420 x 310 x 210mm	£24
• Single Master Plinth	490 x 310 x 105mm	£14
• Double Master Plinth	490 x 310 x 210mm	£26

- A3000 Single Plinth (very sturdy & precision made), has a slot on the left for the switch & cut out on the right for 3.5" Disc Drive **£15**

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version	**£16** (carr £3)
136 Column version	**£20** (carr £4)

Continued→ → → → → → → → →

QUEST MOUSE Mk III

• Quest Mouse III & Quest Paint	£59
• Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont	£89
• Quest Mouse III only	£30
• Quest Paint Software only	£34
• Quest Font Disc (22 Text Fonts)	£15
• Quest Mouse Mat (Red or Blue or Green please specify)	£3
• Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer	£18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

ConQuest

Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

ConQuest ROM Package £30

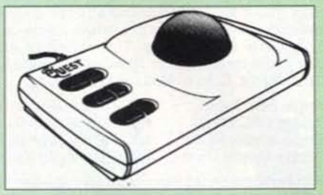
(Price includes software in ROM and a comprehensive Manual).

(Not Compatible with BBC Compact)

(P.S. Conquest is a Quest Paint extension ROM).

Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version	**£25**
QT-20 Archimedes Version	**£26**

Mouse Cleaning Kit

To obtain trouble free operation and prolong the life of your mouse, the high tech rodent requires regular cleaning. Our deluxe mouse cleaning kit is ideal for the purpose £3

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 250234 or 233383

Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes. £15

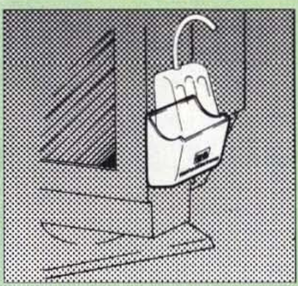
Mk III AMX MOUSE

• AMX Mouse plus Super Art £54

(Please specify for BBC, Master or Compact)

• AMX MOUSE ONLY	£29
• AMX SUPERART Package	£29
• AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£25
• PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
• AMX DESIGN (ROM)	£29
• AMX EXTRA EXTRA	£16
• MOUSE MAT	£3

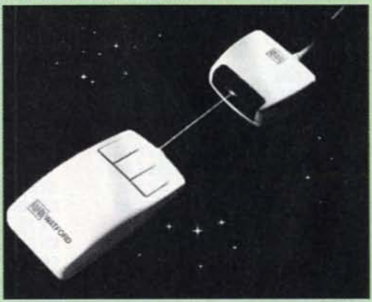
WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive etc.

Only £3

Archi Cordless Mouse



Features
- Infra Red Signal Transmission
- High Resolution 200 DPI
- High Tracking Speed of 600mm/s up
- Anti-static Silicon Rubber Coated Ball
- Low Friction Teflon Footpads
- Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 seconds inactive
- Auto Power Shut-Down after 20 seconds inactive

Price £39

BEEB
VIDEO DIGITISER

"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

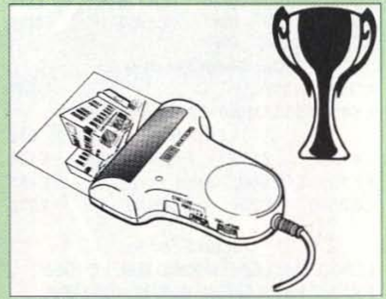
£99

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

Beeb Hand Scanner

Hand-held Scanner for the BBC Micro



Watford Beeb HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs!

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware £99

WAPPING EDITOR
"MIGHTIER THAN THE QUILL"

Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individully proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack	**£59**
Wapping Editor plus Mouse	**£79**

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages laid out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Archi A4 Scanner

This most advanced Archi A4 image scanner is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the !HELP application on the Acorn applications discs. The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.

Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.

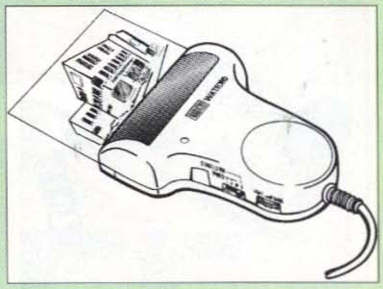
Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.

All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

New Low Prices:

Archi A4 Scanner	£269
Sheet Feeder for above	£75
Scanner + Sheet Feeder	£359

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £119. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

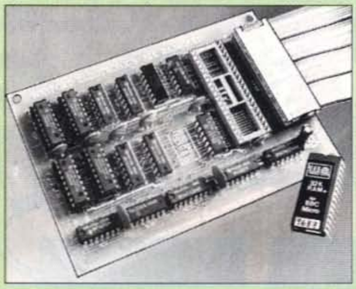
Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version	**£119**
AHS-3 Archi A3000 Version	**£129**

Continued→ → → → → → → → →

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Use the full 32k or the bottom 12K of the expansion RAM as a printer Buffer. (P.S. Only 12K printer buffer can be used with Wordwise & WW+, due to the way they are written).
- Unique facility to turn ROMs off and on again.

Only £54

- **ARIES B-32 Shadow RAM Card £55**

Commander Joystick

Features:

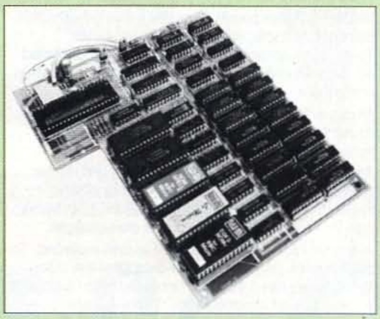
- Direct connection to BBC Analogue input port – no interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Price: £15

Voltmace Joysticks

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24
Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128	£25

ROM/RAM Card



- NO SOLDERING required to fit the board.
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM.
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

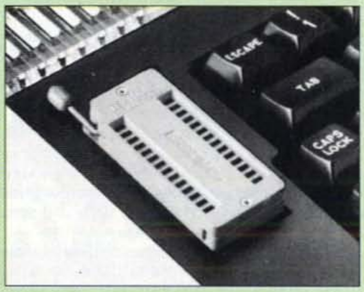
PRICES:

• ROM/RAM card with 32k DRAM	£42
• ROM/RAM card with 64k DRAM	£54
• ROM/RAM card with 128k DRAM	£89

OPTIONAL EXTRAS:

• 16k plug-in Static RAM kit	£8
• 16k DRAM for Upgrade	£13
• Battery backup	£3
• Read and Write protect switches	£2 each
Complete ROM-RAM card with all options fitted	£109

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without having to open the lid. The ZIF socket is located into the ROM Cartridge's position. It is very simple to install. No soldering required. Also included in the price is a plastic see through storage case with antistatic lining, which allows you to store 12 ROMs.

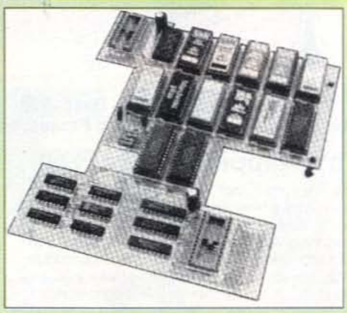
£18

ROM Cartridges for the BBC Master

Will accept the larger Piggy Back ROMs like Interword, Quest, etc.

• Twin **£8;** • Quad **£13**

Solderless Sideways ROM Socket Board



- Increases your BBC Micro's ROM capacity from 4 to 16.
- **No soldering required.**
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish" allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35

Battery Backup fitted **£39**

Battery Backup only **£3**

16K Sideways RAM **£8**

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

Connecting Leads

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug	
to 3 pin DIN Plug + 1 Jack Plug	£2.50
to 7 pin DIN Plug	£3.00
to 3 Jack Plugs	£2.50
6 pin DIN to 6 pin DIN Plug (RGB)	£3.00

Disc Drive Power Leads

Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00;** Dual **£3.75**

Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable
Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	50p	75p
RS423 (5 pin Domino)	70p	80p
Cassette (7 pin DIN)	40p	95p
ECONET (5 pin DIN)	35p	50p
Paddles (15 pin 'D')	150p	250p
Disc Drive Plug 4 way	100p	–
6 way Power Connector	120p	150p

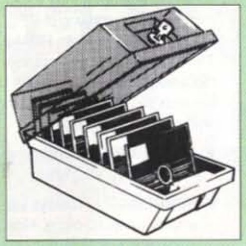
Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

£14

Watford POWER DUCK **£8**

Antistatic Lockable Disc Storage Units



• **M35**	– holds up to 50 5.25" discs	£4.95
• **M85**	– holds up to 95 5.25" discs	£6.95
• **M25***	– holds up to 25 3.5" discs	£4.95
• **M50**	– holds 50 3.5" discs	£6.50
• **M100**	– holds 100 3.5" discs	£6.99
• **M10**	– holds 8 of No. 10 Data Cartridges	**£15**

* Not lockable

Disc Plonker Rack

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: **£2**

3M – Diskettes

Lifetime warranty on 3M Discs

• *10 x 5.25" S/S D/D 40T (744)*	*£5*
• *10 x 5.25" D/S D/D 40T (745)*	*£5*
• *10 x 5.25" S/S D/D 80 Track (746)*	*£7*
• *10 x 5.25" D/S D/D 80 Track (747)*	*£7*
• *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT*	*£9*
• *10 x 3.5" S/S D/D 40/80 Track*	*£7*
• *10 x 3.5" D/S D/D 40/80 Track*	*£7*
• *10 x 3.5" Double Sided High Density*	*£13*

Top Quality Diskettes

Watford's life time guaranteed disc are supplied complete with self stick labels & plastic library case.

• *10 x **M3** 3.5" D/S D/D 80 Track*	*£7*
• *10 x **M9** 3.5" D/S High Density*	*£12*
• *10 x **M4** 5.25" S/S D/D 40 Track*	*£5*
• *10 x **M5** 5.25" D/S D/D 40 Track*	*£5*
• *10 x **M7** 5.25" D/S D/D 80 Track*	*£7*
• *10 x **M8** 5.25" D/S H/D Hi-Density*	*£9*
• ***M2** 3" Double Sided*	***£2.50** each*

Special Bulk Offer Discs

Supplied packed in Anti-Static lockable Disc Storage Unit in lots of 100.
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S/S 40T	D/S 40T	D/S 80T
• Without Sleeves 5.25"	£28	£33	£38
• With Sleeves 5.25"	£31	£36	£41
• 3.5" D/S D/D	£27 for 50		£49 for 100

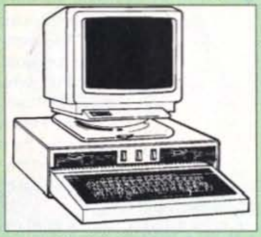
3.5" Disc Drive

These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• CLS35:	Single Disc Drive, 400K	£59
• CLD35:	Twin Disc Drives, 800K	£109
	Disc Drive with PSU	
• CS35:	Single Disc Drive, 400K	£82
• CD35:	Twin Disc Drives, 800K	£126

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drives in Monitor Stand



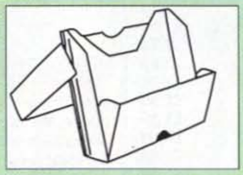
• CDPM 800S – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

• DP35 800 – Same as above except, one disc drive is a 5.25" and the other is 3.5".

£154

Plastic Library Cases



DLC1 –	Holds 5 x 3.5" Discs.	£1.50
DLC2 –	Holds 10 x 3.5" Discs.	£1.90
DLC3 –	Holds 5 x 5.25" Discs.	£1.60
DLC4 –	Holds 10 x 5.25" Discs.	£2.00

Disc Albums

Attractively finished in leather-look PVC Vinyl

DW1 –	Holds 6 x 3.5" Discs	£2.50
DW2 –	Holds 6 x 5.25" Discs	£3.00
DW3 –	Holds 20 x 5.25" Discs	£3.50
DW4 –	Holds 40 x 3.5" Discs or 5.25" Discs	£4.50

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of Cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Acorn & Watford DFSs

• Watford sophisticated DFS ROM	£16.00
• Watford DFS Kit complete	£49.00
• DFS Manual (comprehensive)	£6.95
• Acorn DNFS ROM	£17.00
• Acorn ADFS ROM only	£25.00
• Acorn 1772 DFS ROM Kit	£49.00
• Acorn DFS Kit complete	£48

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1772 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1772 DFS, plus many more added features.

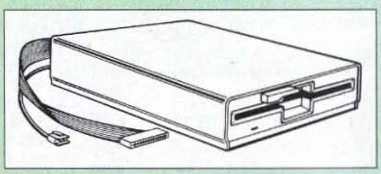
• Complete Kit	Special Price **£44**
• DDFS Manual	(No VAT) **£6.95**
• We will exchange your existing DFS Kit for our sophisticated DDFS for only	**£26**

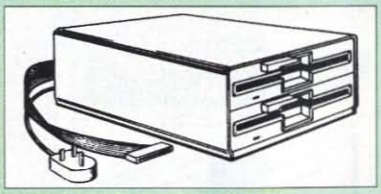
Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted. Follow the trend with a Watford plinth. (Turn to the 6th page of our advert for the Plinths).

P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"





Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
• CLS400S:	Single, 40/80 track 400K Double sided Drive	**£70**
• CLD800S:	Twin, 40/80 track, 800K Double sided Drives	**£138**
	Disc Drive with PSU	
• CS400S:	Single, 40/80 track, 400K Double sided Drive	**£80**
• CD800S:	Twin, 40/80 track, 800K Double sided Drives	**£149**

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Continued→ → → → → → → → →

Computer Concept's ROMS

Disc Doctor	£18
Inter BASE	£49
Inter CHART	£25
Inter SHEET	£37
Inter WORD	£36
Mega-3 ROM	£76
Spell Master	£42

Wordwise plus

£40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

This advance utilities ROM extends the power of your Wordwise plus ROM.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

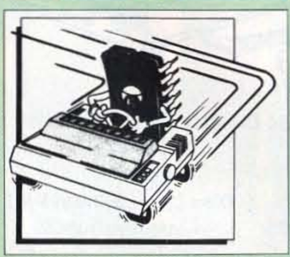
Only **£24**

(N.B. Word Aid requires a Disc interface in your Micro)

Acorn ROMS

View 3.0 ROM	£45
Viewsheet (Acornsoft)	£36
Viewstore	£36
Viewspell – 80T disc	£25
View-Index	£12

View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

Price: Only £29

Mini Office 2 – Disc

for BBC B & B+	£12
for BBC Master	£14
for BBC Compact	£16

(When ordering please specify for which Micro & 40 or 80T Disc)

Assorted ROMS

ACORN ADFS	£25
ACORN BASIC 2 plus User Guide	£22
Acorn BCPL	£42
ACORN DNFS	£17
Acorn FORTH	£32
Acorn OS B+	£25
Acorn OS 1.2	£14
Beebmon	£22
Dump Out 3	£25
Graphics Extension Rom	
GXR-B	£21
GXR-B+	£22
Logotron LOGO	£43
MASTER OS ROM	£38
Master ULA (47)	£15
Master ULA (60)	£10
Numerator – Archi	£69
Numerator – BBC	£39
Pendown ROM	£32
Rom Manager	£20
SERIAL ULA	£13
TED	£35
Termulator Master	£32
Video ULA	£14
1Mb OS ROM	£39

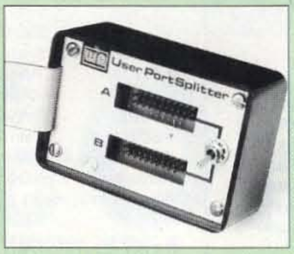
CHIP SHOP

1 MB-10 DIL D-RAM	£4.50
1 MB ZIF D-RAM	£4.00
256K x 4-8 DIP	£4.75
256K x 4-8 ZIF	£4.00
SIMs and SIPs	
256 x 9-8	£11
1Mb x 9-10	£26
1Mb x 9-8	£39
DS3691	£4.50
DS88LS120	£5.25
LM324	£0.45
SN76489	£5.50
SAA5050	£8.75
UPD7002	£6.00
2764-250nS	£3.00
27128A-250n (12V5)	£2.50
27128-250nS (21V)	£4.00
27256-2	£3.00
27512-2	£4.50
27C101G (1 Meg)	£7.00
4013	75p
4020	£1.00
4164-10	£1.55
4464-10	£3.50
4816 RAM	£2.00
41256-8	£2.00
41256-10	£1.50
6264LP-8K	£4.00
6502A CPU	£5.00
65C02 3M	£9.75
65C12	£9.00
6512A	£10.00
6522	£4.00
6522A	£5.00
62256ALS-15	£10.00
62256P-12	£8.50
6818	£4.00
6845SP	£6.00
68B50	£2.95
68B54	£7.50
7438	50p
74LS00	50p
74LS04	50p
74LS10	50p
74LS123	£1.00
74LS163	£1.00
74LS244	£1.00
74LS245	£1.00
74ALS245	£2.75
74LS373	£1.00
74LS393	£1.00
75453	£1.00
75159	£3.00
8271	£39
9637	£2.00
ICL7673PA	£3.00

Acorn Speech Synthesizer package complete, for the BBC B Microcomputer

Special Offer £14

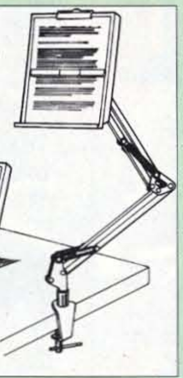
User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22**

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip.

Desk Top **£8**
Angle poise **£12**

NEW

Copy holders as above but with a battery operated, remote controlled cursor/ruler. (By hand or foot pedal.) (Batteries 2 x AA not included.)

Desk Top **£15**
Angle poise **£20**

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs!

The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast.

ERASER EB – Standard version erases up to 16 chips.	£34
ERASER GT – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened.	£36
Spare UV tubes.	£12

ROM Extraction Tool

This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip.	£2
Metal Chip Extractor	£3

Servisol Foam Cleaner

This king size multipurpose foam cleaner spray is ideal for cleaning Keyboard, Monitor, Disc Drive & Computer furniture surfaces.

£2.50

Antistatic Aerosol Spray

Ideal for cleaning and preventing static build-up on TV/Monitor Screens.

£2.50

Aerosol Dust Spray

Ideal for removing dust & dirt from Keyboard & similar inaccessible spaces.

£3

OFFICE MASTER

- CASHBOOK
- FINAL ACCOUNTS
- MAILIST
- EASILEDGER –
- INVOICES & STATEMENT

All this for only **£21** (Disc)

OFFICE MATE

- DATABASE
- SPREADSHEET
- BEEBPLOT

Only £10 (Disc)

Spares for BBC Micro

UHF Modulator	£4
Speaker £3; Speaker Grill	£1
Keyswitches	£1
16MHz Crystal	£2
17.734 MHz Crystal	£2
32.768MHz Crystal	£2
Replacement 17 way Flexible Keyboard Connector	£4
BBC Master Power Supply	£59
BBC Master Keyboard	£62
BBC Master Casing	£49
Refurbished BBC B Spares	
BBC B Casing	£19
BBC B Keyboard	£35
BBC B Power Supply	£39

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£6.95
15 Hr Wordprocessing BBC/WW & WW+	£6.95
30 Hour BASIC (BBC Micro)	£12.95
1st Word Plus – Mastering	£13.95
1st Word Plus Rel. 2 Manual	£10.00
A3000 Technical Reference Manual	£29.00
Acorn DTP A Guide to	£17.00
Advanced User Guide for BBC	**£10.95**
Archimedes 1st Step – Beginners Guide	£9.95
Archimedes Assembly Language	£14.95
Archimedes Basic V Guide	£9.95
Archimedes BBC Basic Guide	£20
Archimedes DTP Manual	£10.00
Archimedes Operating System	£14.95
Archimedes Risc-Os Programmers Reference Manual	£79.00
Assembly Language Quick Ref.	£21.95
BASIC 2 – User Guide	£2
BBC Micro – Within the	£11.95
BBC B Micro User Guide	£15
BCPL User Guide	£9
Budget DTP on the Archimedes	£12.95
C Big Red Book of	£8.95
C – A Dabhand Guide (Archi)	£14.95
C – A Dabhand Guide to	£14.95
C Programming Lang. 2nd Edition	£24.95
COMAL – Introduction to	£9.50
Deutsch Direkt! (Book only)	£5.95
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
FORTH on the BBC Micro	£9.95
ISO-PASCAL Reference Manual	£9.95
Master 512 Guide – Dabs Press	£9.95
Master Operating System	£12.95
Master Reference Manual Part 1	£14
Master Reference Manual Part 2	£14
Master Reference Manual – Advanced	£14
MINI OFFICE II – A Dabhand Guide	£9.95
Mouse User Guide to BBC Micro – the Complete	£5.95
Example Programs on Disc for above	£4.95
PASCAL Programming	£10.95
Risc OS Style Guide	£9.95
RISC Technical Manual 260 pg	£14.95
Understanding Interword – A Beginners Guide	£4.95
View 3.0 User Guide	£10
View Guide (View 2.1)	£5.00
View, Viewsheet & Viewstore – Mastering	£12.95
VIEW Dabhand Guide	£12.95
Viewsheet User Guide	£10
Viewstore User Guide	£10
Z88 – A Dabhand Guide	£14.95
Z88 Computing	£9.95
Z88 Magic	£14.95

BOOKS for IBM PC & Compatibles

8086/8088 Ass. Language Quick Ref	£8.45
8086/8088 Programming the	£17.95
Accountancy software in Business – Using	£14.95
Agenda – Using	£21.95
Aldus PageMaker – Using	£21.45
Amstrad 9512 – Using the	£10.95
Amstrad Basic 2 User Guide	£9.95
Assembly Language 3e – Using	£27.45
Autocad 4th Ed – Mastering	£31.50
AutoCAD – Inside 10 & 11 Spec Ed	£32.45
AutoCAD – Mastering Rel. II 4e	£31.50
Autocad – Mastering Through Rel. 10	£28.95
BASIC – Do it yourself Visual	£18.50
Build Your own 386/386SX & Save	£15.50
Build Your own 80486 IBM Computer	£12.95
C Programming Language 2nd Ed	£26.95
C – Waite Group Turbo C Bible	£27.95
C++ Borland C++ 3 Handbook 2e	£24.95
Clipper 5 Developers Guide	£19.95
Clipper 5.01 3e – Using	£27.45
Computer Users Dictionary	£9.95
Corel Draw 2.1 3e – Inside + Disc	£32.45
Corel Draw 2 3e – Mastering	£26.95
Corel Draw Quick Ref Thro V1.2	£7.95
Corel Draw 2.0 Made Easy	£19.95
Corel Draw v2 Quick Ref	£8.45
Corel Draw Quick Ref v1.2	£8.45
Corel Draw 2 Visual Quick Start incl. Disc	£21.35
dBase 3/4 Complete Ref	£27.45
dBase III Plus – Complete Reference	£19.95
dBase III Plus Handbook 2nd Edition	£22.95
dBase Instant Reference (III & III+)	£10.95
Desk Jet Unlimited	£19.95
DOS Complete Reference 3e	£23.95
DOS for Dummies Through v5.0	£15.45
DOS – Easy (to ver 5)	£18.45
DOS Instant Ref.	£9.75
DOS Instant Reference (up to 3.3)	£6.95
DOS – Programmers Ref. Manual 2nd Ed	£27.45
DR DOS 6 Quick Reference	£8.95
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EGA & VGA Cards Prog. Guide to	£27.95
Excel 4 Windows – A Quick Course	£10.95
Excel 4 for Windows Quickstart	£20.45
Excel 4.0 Windows Made Easy 3e	£16.50
Excel 4 for Windows Learn Fast	£16.50
Excel 4 for Windows 2e – Using	£27.95
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Foxpro 2 – Mastering 2ed	£26.95
Framework III – Mastering	£24.50
GW Basic Users Guide & Ref	£17.95
Hard Disc Instant Ref	£10.95
Hard Disc management – Quick Reference Guide to	£4.95
Hard Disc – Using Your	£27.45
IBM PC & PS/2 – Inside the 3rd Ed	£21.70
IBM PCs 386 486 Power User Guide	£17.95
IBM PC Crash Course & Survival 3e	£17.95
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PROBLEM

Mike Cook delves into his postbag to give some expert advice to your questions

On the agenda...

- Pen plotters
- Filecore in use
- Train control
- Losing sprites
- Till roll printing

Plotting your steps

MY interest over the last four years has centred around building and running a pen plotter. This allows me to dabble in electronics, practise my programming skills and extend my day job abilities as a toolmaker.

I think that plotter performance for the home constructor has been stuck in a rut for some time. The stepping size and top speed of the pen will not inhibit the final result on paper as long as the step size is not too big. But as the drawings become more ambitious the pen speed does become a bit of a nuisance.

Another annoying symptom is the mechanical resonance which constantly grinds away at the ear. The electronics used on commercial plotters have not been available as a separate item except in low cost industrial packages. These are always over the top when it comes to ruggedness, construction, capacity and price.

Because none of the usual electronics and computer magazines have shown signs of improving the situation I decided to have a go myself.

I found two good electronics packages by SGS-Thomson, the GS-D200s motor which costs about £30 and can produce stepping rates of 25,000 per second while requiring three inputs per motor or two inputs if you use half-stepping. The second package is a micro-stepping board called the GS-D250M and is an upgrade option.

The software has been written in Basic V with machine code loops. At the moment the program converts HPGL drawfiles and communicates with the GS-D200S through the User Port/Midi expansion card for the A3000, the AKA12. It uses SYS 6,151 (Osbyte) commands to the user port and this is where I have found problems.

The calls are too slow and I wonder if you know why. Although this add-on runs at 2MHz perhaps there is some obstacle. Alternatively, I am quite happy to use the eight lines available on the printer port which for Archimedes owners comes free and ready to use.

Reading the Body Building articles in the February issue, I noted your comments about printer port usage, having already been aware of the handshaking requirements. I would be grateful for any comments and advice. – **A. Goldasz, Maghull, Merseyside.**

● *Most commercial plotters do not use stepping motors for both cost and speed reasons, they prefer a servo feedback system, where the servo loop is an analogue system. This produces a fast response but at the expense of judder. You can see the pen vibrating in some positions even when it's supposed to be still.*

With these systems the maximum speed is governed by the pen/paper combination. My plotter, a GraphTec, can use Rotoring pens and ink and I use it to draw twice full-size printed circuit artwork on polyester drafting film.

This pen and paper combination will only work well at the very slowest speed and it can take up to three hours to produce a drawing. We did cover stepping motors in the May '84 issue but as you say new chips have appeared since and so I plan to revisit the topic soon.

SYS calls are slow because the operating system has to sort them out. Direct access to the hardware is possible but time sensitive operations suffer because of interrupts and DMA cycles, not all of which can be de-activated. One solution would be to build a board that accepted instructions about how many steps you wanted and it went away and produced them.

This is getting towards a dedicated processor board controlling your plotter which for ultimate performance you will have to use.

Finally, mechanical resonance is, unfortunately, a fact of life. All you can do is to design around it and use an armoury of extra weights and damping components.

Upgrade tips

AS a long-time reader of your columns, I feel that your expert knowledge may help to clear up some of the questions concerning my A410/1 which had an extra 1Mb and a second floppy disc.

I have recently upgraded it to the full 4Mb of memory and have filled all the spaces and changed the link. I read 4,096k on start

➤

Point of sale

I AM in urgent need of a printer that prints on till receipt-sized paper, for connection to an Archimedes as I am writing some software for my father's shop. I am unable to find such a printer anywhere. None of my local dealers can help and I cannot find one in any advertisement.

I may also need a barcode scanner and software for the same project and I wondered if there was one on the market. I would be grateful for any advice as I am getting desperate. – **Richard Lucking, Worthing, Sussex.**

● *The reason you have not had much success looking in advertisements is that you are looking at end user publications. What you need to do is to look at OEM – original equipment manufacturer – publications or trade magazines. You will find these in large city libraries.*

Epson do a range of 16, 24 and 40 column miniature impact printers with both serial and parallel interfaces for around £80. The model numbers are PU150, PU160 and PU164.

There is also a range of accessories like a printer cover, paper role holder and paper winder. Datac produce a range of panel mounting and standalone dot matrix receipt printers at about £300.

For reading bar codes Penny & Giles produce a system for the BBC model B at £270, which includes the software to produce the bar codes on your printer. It plugs into the user port but some code comes on Eprom so it might not transfer easily to the Archimedes.

Barcode wands and slot readers are made by Hewlett Packard at around £80. They even produce one that contains its own microprocessor and sends Ascii formatted data to the serial port. However, you do pay for this with a price around £260.

For supply of these products and further information contact Farnell Electronic Components (0532 799123).

SOLVED

HELP

PROBLEM
SOLVED
HELP

up. Although inserting the ram is not an everyday hobby, the machine worked when switched on and there were no error messages nor immediate problems. But how do I know the new memory map is good?

I remember several programs from the BBC B which would test and give go/no go indications of any failures in the map, but I haven't seen such a utility for the Archimedes. Has the machine a self-check feature?

Since the upgrade I am now getting frequent *Filecore in use* errors, an annoying condition that was all but unknown in the 2Mb machine.

Have I caused a fault during the ram upgrade process? It is almost impossible to tell with these memory chips if a chip leg has not *homed* properly.

As I am considering a hard disc upgrade, do you know of any existing literature to advise me, even if it is of a technical nature?

I have long been impressed by the construction articles in the magazine and although my soldering iron retired with me, the urge is still there. Is there are possibility of a project for the computer to carry out the function of a barograph? I have heard that pressure sensor devices are available. – **Gordon Woodside, Dollar, Clackmannanshire.**

- *There are memory testing programs for the Model B but most of them were of little use. A good memory testing program is very difficult if not impossible to write. It is not just a matter if storing something in memory and reading it back to see if it is correct, that only catches one small possible fault.*

The majority of memory faults occur with the address decoding circuitry. This means that writing to one location will affect another. Therefore a good memory test program should write a bit pattern to one memory location and test all other locations to see if they have changed. With a large amount of memory this is impossibly time consuming.

It is possible that you have had an increase in Filecore errors because you are running more applications at the same time. This is a well known bug in Risc OS 2 caused when too many floppy discs have been seen by the Filer – if you always dismount the floppies it won't happen. This bug has been solved in Risc OS3.

Using hard drives is similar to using floppies so most of the information should be transferable. The major difference is due to the size of storage available which leads to a need for more careful planning of your layout of folders and sub-folders.

For example you do not want too many folders on the top level but you want your !System at or near the top. Also your fonts should be pretty accessible.

You might want some applications like !Edit and !Draw on the top level but remember that when the computer sees an application you lose some memory storing its sprite.

Apart from various magazine articles there's no other independent literature on upgrading

Finally, the subject of pressure sensors was dealt with in the April '86 Body Building article. However, pressure sensors are not cheap and I have seen some tabletop baragraphs selling at less than the price of the sensor so I will be investigating what is in them. Watch, if not this space, then the one next to it.

Train control

I AM currently studying A-level Technology at Torquay Boys Grammar School. For my main project I am designing an automatic computer-controlled model railway layout suitable for use as a window display.

I am now conducting my Investigation and Research into the project and I intend to use a BBC B or an A3000. However, I need a suitable interface. Can you give me some advice and information on interface projects featured in the magazine? – **Barry Tabrah, Ipplepen, Devon.**

- *Sending an SAE to Musbury Consultants will bring a list of all past Body Building articles. Please note the new address: Musbury Consultants, 5 Helmshore Road, Haslingden, Rossendale, Lancs BB4 4BG.*

They can also supply photocopies of past articles for a nominal charge of £1. For control of a model train you need to look at April '91 which showed how to control motors using a solid state driver. This could also be used for changing the points.

You need to sense the presence of the trains and one way is to fit each train with a small magnet and use a reed switch – from January '88 – or a Hall effect switch, look at November '90.

Alternatively you could use infra-red emitters and detectors in the same way as the wind direction indicator which was featured in October '86.

It's no longer Greek for me

I USE my relatively new A3000 for application programming in the PC emulator as well as for music and computer graphics. Needing some DTP I recently bought Impression and Poster, but I have two big problems.

When I want to put some Greek text in my Poster page I find out that the drive is working – reading the fonts – after I do something with the text. I work with 2Mb and a 640k cache and the font is Trinity.Medium.Greek. After three or four attempts my Greek transforms into the System font and I have to reset and start again.

The second problem is with the A3000 itself. When I load any disc and then Applications Disc 1, system errors appear such as *Address Exception at &0000708C* and sometimes it insists on going with another error *SWI not known*. If I press Cancel and return to the desktop my Draw or Edit icon has been replaced with an App icon.

My Morley memory upgrade is connected properly and the same error occurs if I unplug it and work with the standard 1Mb. Can you help? – **Elias Tekertalis, Athens, Greece.**

- *The Poster application is reverting to the system font because it has lost your Greek font. In other words the font manager can't find it.*

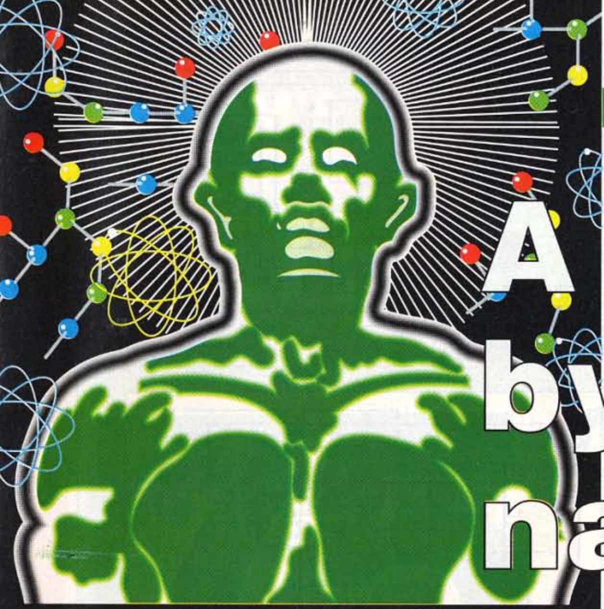
I did have a similar problem when I was writing BookBinder and it was a rather subtle programming error. I suspect that Poster has the same problem – you should contact its publishers as I know no user fix.

The most common cause of the SWI *not known error is that you have some modules unplugged. To find out if this is so press the F12 key and get the * prompt. Then type UNPLUG and you will get a list of any that are inactive.*

To re-activate them type RMReInit followed by the module's name. Some software unplugs modules to provide more memory space but unfortunately does not re-activate them.

Your Applications disc has an error on it, it sounds like it is in the place where the !Draw application has its sprite file. If the operating system can't read an application's sprite file or if it does not have one it will place a default application icon in its place.

Get your dealer to replace or re-copy your Applications disc.



A mouse by another name

Mike Cook looks at two alternatives to the mouse

The Beeb Body Building Course

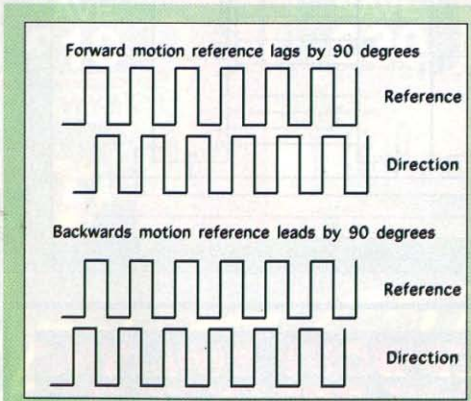

Forward motion reference lags by 90 degrees
Reference
Direction
Backwards motion reference leads by 90 degrees
Reference
Direction

Figure I: Mouse signals

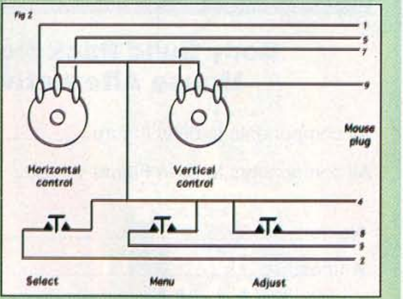
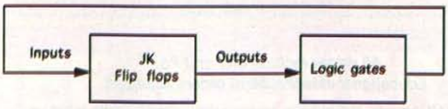


Figure II: Two control mouse substitute



J	K	Qn
0	0	Qn-1 (no change)
1	0	1
0	1	0
1	1	$\overline{\text{Qn-1}}$ (toggle)

Figure III: A JK flip flop feedback counter

NOW don't get me wrong, I like mice. Some of my best friends are mice, but would you like your daughter to marry one? I have always found mice ... well a bit wimpish. So this month I would like to look at two alternatives.

Let's start off by looking at the signals produced by a mouse. These are shown in Figure I for one direction. Basically there are two signals known as reference and direction that consist of square waves out of phase by 90 degrees – these are sometimes called quadrature signals.

If the movement is in one direction the direction signal leads the reference signal – if in the other direction it lags the reference signal. In that way the computer knows which way the mouse is being moved. These signals are generated by optical slot sensors from movement of the mouse ball.

Any substitute for a mouse must therefore simulate these signals. The simplest substitute consists of two shaft sensors. You would then have control over the mouse using two rotary controls rather like an Etch-a-sketch. While you can use optical rotary shaft encoders, these are quite expensive.

A cheaper alternative would be to use a mechanical system to generate the pulses. There is a control that generates these quadrature signals from wiping a contact over a printed circuit pattern.

This produces quite acceptable results for this application. You will also need push switches to replace the mouse buttons – simply *push to make* connections to earth.

The circuit diagram is shown in Figure II. This arrangement could be useful if you wanted to separate the vertical and horizontal components of positioning. It can also be the basis for other arrangements.

For example, you could arrange a system rather like an XY plotter where moving a pointer moves the mouse position, rather like a graphics tablet. There could be other forms of movement like the amount of swivel on a chair that you can translate into mouse movement.

However, a more conventional alternative to a mouse is a trackball. I always say a trackball is just a dead mouse, on its back with its legs in the air. It has a big advantage in that it does not take up unlimited desk space but just sits in its allotted space and never wanders.

Now some people swear by trackballs and others swear at them. It seems that you either find them useful or useless.

Personally, I find a mouse easier to use when I am using my right hand. However, if I am forced to use my left, I find a trackball much more usable.

Trackballs tend to be expensive but I have an Atari model that I interfaced to my Model B several

Table I: Sequence of count

Forward movement B	Forward movement A	Reverse movement B	Reverse movement A
0	0	0	1
1	0	1	1
1	1	1	0
0	1	0	0
0	0 repeat	0	1 repeat

years ago. Therefore I thought it was time it came out of retirement to provide an occasional replacement for the mouse.

The problem with the Atari trackball is that it produces different signals than the Archimedes requires. It produces a step which is the same as the reference signal but its other signal is a direction signal. This is high when moving left and low when moving right. Therefore we have to use these two signals to generate two quadrature signals.

This proved a bit more of a challenge than I first thought. My first attempt produced no movement at all and the second was not very satisfactory producing occasional direction reversals. My third attempt does work, and works well, so that's the one I will show you here.

The idea is to use the step signal to create a special sequence binary count. You need one sequence to move to the left and another to move to the right. Therefore, the direction signal should change the sequence these are shown in Table I.

Now you can generate an arbitrary counting sequence using a JK flip flop. This is a digital component I have not used before in any of my articles so I will explain a little of how they work.

Two data inputs are labelled, for no apparent reason, J and K, and there is also a clock input. On the falling edge of the clock the output Q goes to a state determined by the J and K inputs.

This state can be logic one or logic zero, no change or the inverse. To design a counter you have to construct a table of the required input values for each step in the sequence and then read off a logic equation that generates these states from the current output states.

Finally you implement the logic of these equations in a feedback circuit. The basic block diagram is shown in Figure III.

To get the output into any given state there are two different input combination you can use, either force it to the required level (1 or 0) or let it get there by an inversion or no change from the current state.

This means that for every transition only one signal needs to be specified and the other is in a don't care state. For our problem we need two flip flops which I have called imaginatively A and B. The sequence we need is shown in Table II along with the logic function for each input.

To get the forward or reverse sequence we simply have to switch between the two functions. The diagram of the counter is shown in Figure IV. It looks quite complex but as there are only two chips involved the actual wiring can be shown much simpler.

Remember, we need two of these circuits, one for horizontal and one for vertical movement. The complete circuit is shown in Figure V. This also includes two extra push buttons as the Atari track ball has only one.

Construction is not critical and can be completed on veroboard. In this case however it is best to simply place the chips on the board and use wires to link the various signals. It is a mistake to try and let the tracks pre-make any of the connections.

The 9-pin mouse plug is a little tricky to wire up. Basically the trick is only to bare and tin about 4mm of wire and pre-tin the plug side of the joint. Then bring the wire alongside the pin and apply the soldering iron with no extra solder.

When all the connections are made and tested then fill the back of the plug with silicon rubber to prevent the wires snapping due to repeated flexing.

- *I found the Atari track ball a good emergency substitute when my mouse failed and also allowed left-handed operation as I wrote down figures with my right. See you next month providing I have not been savaged by a rampaging mob of redundant mice.*

Table II: Sequence of count and required J and K input values

Forward						Reverse					
B	A	Ja	Ka	Jb	Kb	B	A	Ja	Ka	Jb	Kb
0	0	0	X	1	X	0	1	X	0	1	X
1	0	1	X	X	0	1	1	X	1	X	0
1	1	X	0	X	1	1	0	0	X	X	1
0	1	X	1	0	X	0	0	1	X	0	X

So that $Ja = B$, $Ka = \bar{B}$, $Jb = \bar{A}$, $Kb = A$

So that $Ja = \bar{B}$, $Ka = B$, $Jb = \bar{A}$, $Kb = Al$

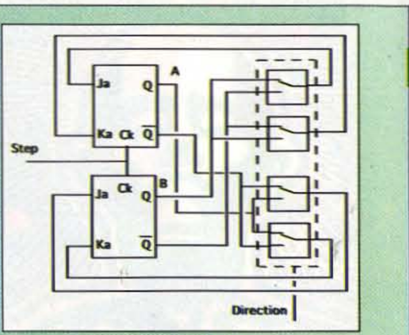


Figure IV: The required two-sequence counter

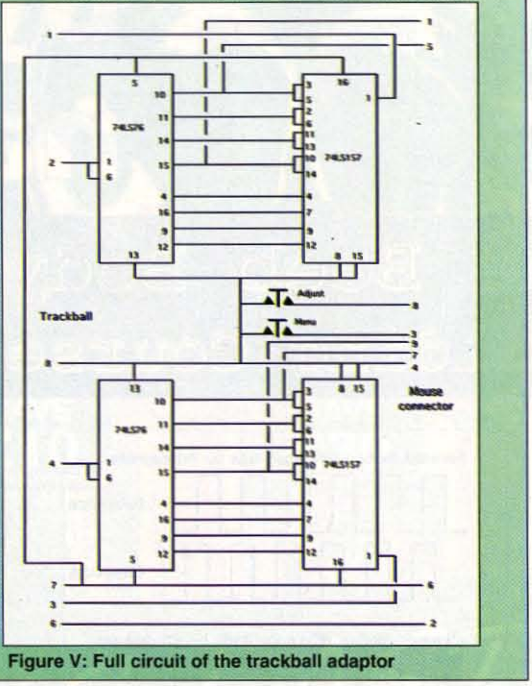


Figure V: Full circuit of the trackball adaptor

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Rom an

SNAKES AND L

RAM reckons he's surrounded by idiots. Rom is an idiot who can surround anything but has managed to write a game this month – really?

Ram was surprised too and not to be outdone has taken Rom's program as the basis for his own version because he's like that.

Ever since Rom's mother was frightened by a reptile at birth he's had a natural aversion to slimy slithery serpents – and he's not keen on snakes either! So he has decided to exorcise his snakephobia by making a two player surround-type game imaginatively called Snake1.

The idea is that you manoeuvre your ever-expanding snake around an enclosed area avoiding your opponent's snake, the walls, blocks and even yourself.

Rom's version allows you to play the best of five with the speed of snake increasing each time.

The listing won't take long to type in and shows how an easy, simple but entertaining game can be created without the over-sophistication of hyper-realistic graphics.

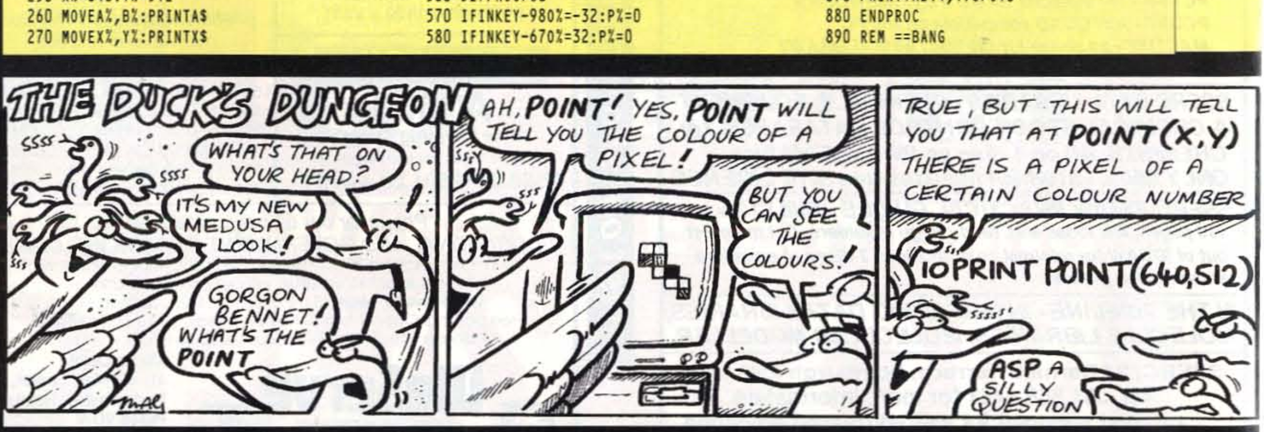
It is worth bearing in mind that some latter day games are nothing more than old favourites cloaked in superior graphics technology – but the game's the same.

Ram's program Snake2 – must be all those film sequels getting to him – shows how from a simple idea, an equally simple idea, can flow.

This time the rules are somewhat reversed or, like Rom, backward! The same keys are used but it no longer matters if your snake collides with the wall or if you tangle yourself up.

No, this time your snake has to eat the purple squares and the number you have eaten is indicated by a mounting scale at the sides of the screen. However if you collide with your rival you lose points so it's

```
    1 REM SNAKE1
    2 REM by Mike Goldberg
    3 REM (c) The Micro User
   10 MODE2
   20 first%=0
   30 end%=0
   40 *FX10,10
   50 *FX9,10
   60 VDU23;8202;0;0;0;
   70 VDU23,224,0,112,112,112,112,112,11
2,0
   80 REPEAT
   90 AS%=0:XS%=0
   95 d%=220:REM DELAY
  100 REPEAT
  110 VDU4,20
  120 COLOUR132:CLS
  130 VDU28,0,2,19,0:COLOUR128:CLS
  140 VDU28,1,30,18,4:COLOUR128:CLS:VDU2
6
  150 COLOUR3:PRINTTAB(2,1);AS%TAB(17,1)
;XS%
  160 K$=CHR$18+CHR$3
  170 A$=K$+CHR$1+CHR$224
  180 X$=K$+CHR$2+CHR$224
  190 W$=K$+CHR$4+CHR$224
  200 VDU5
  210 MOVE96,1024:PRINTA$
  220 MOVE1152,1024:PRINTX$
  230 M%=0:N%=32:O%=0:P%=32
  240 A%=608:B%=512
  250 X%=640:Y%=512
  260 MOVEA%,B%:PRINTA$
  270 MOVEX%,Y%:PRINTX$
  280 PROCwalls
  290 IFfirst%=0REPEATUNTILGET=32:first%
=1
  300 REPEAT TT%=TIME+d%/10
  310 PROCgreen
  320 PROCcheck(X%,Y%,1)
  330 SOUND1,-12,90,1
  335 IFend%=1GOTO370
  340 PROCred
  350 PROCcheck(A%,B%,0)
  360 REPEATUNTILTIME>TT%
  370 UNTILend%=1
  380 end%=0
  385 d%=d%-20
  390 UNTILAS%=5ORXS%=5
  400 PROCwho
  410 REPEATUNTILGET=32
  420 UNTIL0
  430 REM ==GREEN TEAM
  440 DEFPROCgreen
  450 IFINKEY-73N%=32:M%=0
  460 IFINKEY-105N%=-32:M%=0
  470 IFINKEY-103M%=-32:N%=0
  480 IFINKEY-104M%=32:N%=0
  490 PROCm(M%,N%)
  500 ENDPROC
  510 DEFPROCm(x%,y%)
  520 X%=X%+x%:Y%=Y%+y%
  530 MOVEX%,Y%:PRINTX$
  540 ENDPROC
  550 REM ==RED TEAM
  560 DEFPROCred
  570 IFINKEY-98O%=-32:P%=0
  580 IFINKEY-67O%=32:P%=0
  590 IFINKEY-68O%=0:P%=32
  600 IFINKEY-83O%=0:P%=-32
  610 PROCm2(O%,P%)
  620 ENDPROC
  630 DEFPROCm2(a%,b%)
  640 A%=A%+a%:B%=B%+b%
  650 MOVEA%,B%:PRINTA$
  660 ENDPROC
  670 REM ==CHECK
  680 DEFPROCcheck(K%,L%,V%)
  690 IFPOINT(K%+16,L%-16)>2ORPOINT(K%+1
6,L%-16)<1PROCbang:PROCwin(V%)
  700 ENDPROC
  710 REM ==WIN
  720 DEFPROCwin(V%)
  730 IFV%=0VDU19,2,10;0;:XS%=XS%+1
  740 IFV%=1VDU19,1,9;0;:AS%=AS%+1
  750 VDU4:COLOUR3:PRINTTAB(2,1);AS%TAB(
17,1);XS%:VDU5
  760 end%=1
  770 IFAS%=5ORXS%=5ENDPROC
  775 *FX15
  780 REPEATUNTILGET=32
  790 ENDPROC
  800 REM ==WHO WON
  810 DEFPROCwho
  820 VDU4
  830 COLOUR5
  840 IFAS%=5PRINTTAB(4,1)"RED WINS"
  850 IFXS%=5PRINTTAB(4,1)"GREEN WINS"
  860 REPEATUNTILGET=32
  870 PRINTTAB(4,1)SPC10
  880 ENDPROC
  890 REM ==BANG
```


THE DUCK'S DUNGEON
SSSS
WHAT'S THAT ON YOUR HEAD?
IT'S MY NEW MEDUSA LOOK!
GORGON BENNET! WHAT'S THE POINT
MAL
AH, POINT! YES, POINT WILL TELL YOU THE COLOUR OF A PIXEL!
BUT YOU CAN SEE THE COLOURS!
TRUE, BUT THIS WILL TELL YOU THAT AT POINT(X,Y) THERE IS A PIXEL OF A CERTAIN COLOUR NUMBER
10PRINT POINT(640,512)
ASP A SILLY QUESTION

d Ram

Mike Goldberg slithers around the screen

still best to slither clear.

Also there's a flashing X on screen which will halt your opponent for a while if you can snaffle it first – your opponent's scale will flash while inoperative. Then you can (side)wind your way around the screen munching up the goodies unhindered.

This does wonders for a peaceful relationship between playing partners as you can see with Rom and Ram – see cartoon. The player whose scale reaches the top wins the game but naturally loses in the popularity stakes.

ADDERS

KEYS

Direction	Red Snake	Green Snake
Left	Z	<
Right	X	>
Up	F	*
Down	C	?
Restart at any time		Spacebar

I WON!
NO YOU NEVER!
SMASH!

```
    1 REM ==SNAKE2
    2 REM by Mike Goldberg
    3 REM (c) The Micro User
   10 ENVELOPE1,1,4,-8,13,20,20,620,127,
-1,-4,-4,90,50
   20 ENVELOPE2,1,-3,-2,0,10,5,0,127,-1,
-2,-3,126,100
   30 MODE2
   40 VDU19,14,12;0;
   50 VDU23;8202;0;0;0;
   60 DIMA%(20),B%(20)
   70 DIMX%(20),Y%(20)
   80 RED%=0:GREEN%=0
   90 PROCvdu
  100 REPEAT
  110 PROCinit
  120 PROCscreen
  130 REPEAT
  140 PROCplace_bits
  150 PROCstart
  160 REPEAT TT%=TIME+5
  170 IFstop%=1AND TIME<q%GOTO230
  180 IFstop%=1AND TIME>q%stop%=0:VDU19,
1,1;0;
  190 PROCone
  200 A=INKEY(1)
  210 IFstop%=2AND TIME<q%GOTO240
  220 IFstop%=2AND TIME>q%stop%=0:VDU19,
2,2;0;
  230 PROCtwo:REPEATUNTILTIME>TT%
  240 UNTILcc%=n% OR v%=840 OR l%=840
  250 IFv%=840 OR l%=840 GOTO300
  260 n%=n%+2
  270 T%=T%+1:t%=t%+1
  280 VDU24,96;100;1176;832;:GCOL0,128:C
LG
  290 VDU26
  300 UNTILv%=840 OR l%=840
  310 VDU26,4
  320 COLOUR3
  330 IFv%=840PROCredwin:RED%=RED%+1
  340 IFl%=840PROCgreenwin:GREEN%=GREEN%
+1
  350 PRINTTAB(4,25)"PRESS SPACE"
  360 REPEATUNTILGET=32
  370 CLS
  380 UNTIL0
  390 REM ==START
  400 DEFPROCstart
  410 A%=160:B%=160
  420 X%=1088:Y%=160
  430 VDU5
  440 MOVEA%,B%:PRINTA$
  450 MOVEX%,Y%:PRINTX$
  460 D%=0:E%=32
  470 F%=0:G%=32
  480 C%=0:c%=0
```

➤

```
  900 DEFPROCbang
  910 GCOL0,0:MOVEK%,L%:PRINTCHR$224:GCO
L0,14:MOVEK%,L%:PRINT"*"
  915 GCOL3,4
  916 K%=K%+16:L%=L%-16
  920 FORI%=1TO10
  921 MOVE0,0:DRAWK%,L%
  922 MOVE1280,0:DRAWK%,L%
  923 MOVE0,896:DRAWK%,L%
  924 MOVE1280,896:DRAWK%,L%
  925 NEXT
  930 ENDPROC
  940 REM ==WALLS
  950 DEFPROCwalls
  960 R%=RND(10)
  970 FORI%=1TOR%
  980 MOVE(RND(34)*32)+64,(RND(24)*32)+6
4
  990 PRINTW$
 1000 NEXT
 1010 ENDPROC
```

Get it right

```
                110 = 1EEE A   320 =  8E0 6   510 = 6F8A 6   720 = 619D 3    915 =  ADA 4
                120 = 7819 B   330 = 8D46 4   520 = CE0C 4   730 = 2471 5    916 = F7A4 3
                130 = 1548 7   335 = 81A9 D   530 =  28B E   740 = E534 9    920 = 1805 7
                140 = FE55 2   340 = 1CB0 F   540 = ED0F 4   750 = 7CFA D    921 = 1F4E A
                150 = 188E 5   350 = B7C9 7   550 =    0 4   760 = 61C3 A    922 =   2E 1
                160 = 3ECC C   360 = BF1A D   560 =  A28 E   770 = 1780 5    923 = A99C 9
                170 = 57E1 A   370 = A451 A   570 = F3D0 A   775 = A022 C    924 = D677 0
  1 =    0 0    180 = C18C 6   380 = 71E2 A   580 = 6EB1 5   780 = 5B81 A    925 = 2C83 9
  2 =    0 0    190 = 8D3F 0   385 = 7EA9 7   590 = 788F 4   790 = ED0F 6    930 = ED0F 7
  3 =    0 0    200 = 667A 2   390 = 4315 0   600 = 97DB 3   800 =    0 6    940 =    0 7
 10 = DA59 9    210 = F5E8 4   400 = 3077 5   610 = 9912 7   810 = 26EF 7    950 =  A15 4
 20 =  805 7    220 = CE38 A   410 = 5B81 A   620 = ED0F D   820 = 765B 4    960 =  276 6
 30 = 71E2 5    230 = 5842 C   420 = 53CE D   630 = 34BE 6   830 = A9CD C    970 =  4E8 C
 40 = 920D 6    240 = A2AA B   430 =    0 D   640 = E2CF 3   840 = 571B 8    980 = 361A C
 50 = 4198 F    250 = A134 4   440 = 69A1 6   650 = F364 2   850 = 66EF 3    990 = 27AC F
 60 = F716 5    260 = F364 3   450 = 71E7 A   660 = ED0F D   860 = 5B81 A   1000 = 2C83 A
 70 = 7D7E 7    270 =  28B 1   460 = F06F 6   670 =    0 D   870 = F2AD 0   1010 = ED0F 9
 80 = BFBA 0    280 = A171 C   470 = 1877 F   680 = EA9D 0   880 = ED0F 6
 90 = 2A00 6    290 = 26E9 B   480 = 7DD0 0   690 = 73DA F   890 =    0 6
 95 = D189 6    300 = 52C4 C   490 = C9B1 D   700 = ED0F E   900 = BDA7 B
100 = BFBA 6    310 = C2C5 6   500 = ED0F 6   710 =    0 E   910 = DCA4 B
```

THIS COMES IN HANDY FOR COLLISION DETECTION IN GAMES. BADDIES CAN BE IDENTIFIED BY COLOUR AND POSITION
AHH! A BLUE MEANIE!
SUDDENLY...
HEY! WHO'S THAT?
IT'S...
YIKES!
THE PERMINATOR!
HA HA!
HAR!
IT'S NOT ORIGINAL EITHER!

Rom and Ra

TAKE IT EASY

If you would like to save wear and tear on your fingers you'll find this listing – together with all the others from this issue – on this month's disc, sent free if you subscribe to The Micro User.

```
➤
  490 VDU19,2,2;0;19,1,1;0;:TIME=0
  500 cc%=0
  510 stop%=0
  520 REPEATUNTILGET=32
  530 ENDPROC
  540 REM ==PLAYER ONE
  550 DEFPROCone
  560 IFINKEY-98D%=-M%:E%=0
  570 IFINKEY-67D%=M%:E%=0
  580 IFINKEY-68D%=0:E%=N%
  590 IFINKEY-83D%=0:E%=-N%
  600 PROCm1
  610 ENDPROC
  620 REM ==MOVE ONE
  630 DEFPROCm1
  640 A%(C%)=A%:B%(C%)=B%
  650 IFPOINT(A%+D%,B%+E%)=5MOVEA%+D%,B%
+E%:PRINTP$:PROCscore(1,8)
  660 IFPOINT(A%+D%,B%+E%)=2PROCscore(1,
-8)
  670 IFPOINT(A%+D%,B%+E%)=4ENDPROC
  680 IFPOINT(A%+D%,B%+E%)=14stop%=2:VDU
19,2,10;0;:GCOL0,0:MOVEA%+D%,B%+E%:PRINT
p$:GOSUB1760:TIME=0
  690 A%=A%+D%:B%=B%+E%
  700 MOVEA%,B%:PRINTA$
  710 C%=(C%+1)MOD(T%+1)
  720 IFC%=T%PROCremove1
  730 ENDPROC
  740 REM ==PLAYER TWO
  750 DEFPROCtwo
  760 IFINKEY-103F%=-M%:G%=0
  770 IFINKEY-104F%=M%:G%=0
  780 IFINKEY-73F%=0:G%=N%
  790 IFINKEY-105F%=0:G%=-N%
  800 PROCm2
  810 ENDPROC
  820 REM ==MOVE TWO
  830 DEFPROCm2
  840 X%(c%)=X%:Y%(c%)=Y%
  850 IFPOINT(X%+F%,Y%+G%)=5MOVEX%+F%,Y%
+G%:PRINTP$:PROCscore(2,8)
  860 IFPOINT(X%+F%,Y%+G%)=1PROCscore(2,
-8)
  870 IFPOINT(X%+F%,Y%+G%)=4ENDPROC
  880 IFPOINT(X%+F%,Y%+G%)=14stop%=1:VDU
19,1,9;0;:GCOL0,0:MOVEX%+F%,Y%+G%:PRINTp
$:GOSUB1760:TIME=0
  890 X%=X%+F%:Y%=Y%+G%
  900 MOVEX%,Y%:PRINTX$
  910 c%=(c%+1)MOD(t%+1)
  920 IFc%=t%PROCremove2
  930 ENDPROC
  940 REM ==SCORE
  950 DEFPROCscore(P%,z%)
  960 IFP%=1:IFv%+z%<136ENDPROC
  970 IFP%=2:IFl%+z%<136ENDPROC
  980 IFP%=1ANDz%=8GCOL0,1:MOVEu%,v%:VDU
226:v%=v%+16:cc%=cc%+1:SOUND0,-15,2,2
  990 IFP%=1ANDz%=-8GCOL0,0:MOVEu%,v%-16
:VDU226:v%=v%-16:SOUND1,2,50,1
 1000 IFP%=2ANDz%=8GCOL0,2:MOVEk%,l%:VDU
226:l%=l%+16:cc%=cc%+1:SOUND0,-15,1,2
 1010 IFP%=2ANDz%=-8GCOL0,0:MOVEk%,l%-16
:VDU226:l%=l%-16:SOUND2,2,80,1
 1020 ENDPROC
 1030 REM ==VDUS
 1040 DEFPROCvdu
 1050 VDU23,224,240,240,240,240,240,240,
240,240
 1060 VDU23,225,160,80,160,80,160,80,160
,80
 1070 VDU23,226,240,240,96,96,0,0,0,0
 1080 VDU23,227,144,144,96,96,96,96,144,
144
 1090 ENDPROC
 1100 REM ==SCREEN
 1110 DEFPROCscreen
 1120 VDU26,4
 1130 COLOUR133:CLS
 1140 VDU28,0,31,19,3
 1150 COLOUR132:CLS
 1160 VDU24,96;100;1176;832;
 1170 GCOL0,128:CLG
 1180 VDU24,24;124;56;832;
 1190 CLG
 1200 VDU24,1216;124;1248;832;
 1210 CLG
 1220 VDU26,30
 1230 COLOUR7:COLOUR128
 1240 COLOUR1:PRINTTAB(1,0)"RED":COLOUR2
:PRINTTAB(14,0)"GREEN"
 1250 COLOUR3:PRINTTAB(2,1);RED%TAB(16,1
);GREEN%
 1260 ENDPROC
 1270 REM ==INIT
 1280 DEFPROCinit
 1290 FORI%=1TO20
 1300 A%(I%)=0:B%(I%)=0:X%(I%)=0:Y%(I%)=
0:NEXT
 1310 K$=CHR$18+CHR$3
 1320 A$=K$+CHR$1+CHR$224
 1330 X$=K$+CHR$2+CHR$224
 1340 P$=K$+CHR$5+CHR$225
 1350 p$=K$+CHR$14+CHR$227
 1360 Z$=CHR$226
 1370 M%=32:N%=32
 1380 D%=0:E%=32
 1390 u%=32:v%=136:k%=1216:l%=136
 1400 T%=8:t%=8
 1410 n%=10:q%=200
 1420 ENDPROC
 1430 REM ==REMOVE1
 1440 DEFPROCremove1
 1450 SOUND1,1,20,4
 1460 FORI%=0TOT%
 1470 MOVEA%(I%),B%(I%):IFB%(I%)>0PRINTA
$
 1480 NEXT
 1490 ENDPROC
 1500 REM ==REMOVE2
 1510 DEFPROCremove2
 1520 SOUND2,1,90,4
 1530 FORI%=0TOt%
 1540 MOVEX%(I%),Y%(I%):IFY%(I%)>0PRINTX
$
 1550 NEXT
 1560 ENDPROC
 1570 REM ==PLACE-BITS
 1580 DEFPROCplace_bits
 1590 VDU5
 1600 FORI%=1TOn%
 1610 x%=RND(33)*32+96
 1620 y%=RND(21)*32+128
 1630 IFPOINT(x%,y%)<>0GOTO1610
 1640 IFPOINT(x%,y%)=0MOVEx%,y%:PRINTP$
 1650 NEXT
 1660 x%=RND(33)*32+96:y%=RND(21)*32+128
:IFPOINT(x%,y%)=0MOVEx%,y%:PRINTp$
 1670 ENDPROC
 1680 REM ==REDWIN
 1690 DEFPROCredwin
 1700 PRINTTAB(5,4)"RED WINS!"
 1710 ENDPROC
 1720 REM ==GREENWIN
 1730 DEFPROCgreenwin
 1740 PRINTTAB(4,4)"GREEN WINS!"
 1750 ENDPROC
 1760 x%=RND(33)*32+96:y%=RND(21)*32+128
:IFPOINT(x%,y%)<>0GOTO1760
 1770 MOVEx%,y%:PRINTp$
 1780 RETURN
```

Get it right

```
                           280 = FC69 E   500 = 1DAC 9   720 = 1C1D A   940 =    0 A  1160 = 6053 6  1380 = 97B3 C  1600 = 4410 5
                           290 = B962 4   510 =  922 A   730 = ED0F 5   950 = A654 F  1170 = 1CC7 7  1390 = D43D 6  1610 = DA2F B
                           300 = 1FDF A   520 = 5B81 3   740 =    0 5   960 = 5044 A  1180 = E486 0  1400 = 5937 C  1620 = 90D7 D
                           310 = DD2D 7   530 = ED0F 6   750 = 6CF2 A   970 = 9FB6 A  1190 = 6A37 0  1410 = F02F 8  1630 = 18AF 3
                           320 = C90B 1   540 =    0 6   760 = 5558 A   980 = AC17 2  1200 = 247D 1  1420 = ED0F 4  1640 = 5CE0 6
                           330 = B043 4   550 = C7C1 D   770 = 110F E   990 = 6D4F 9  1210 = 6A37 C  1430 =    0 4  1650 = 2C83 4
              120 = 9538 3 340 = B8FA 4   560 = EA6A B   780 = FBDD E  1000 = F43C 7  1220 = 9814 8  1440 = DA89 E  1660 = A8A1 3
              130 = BFBA 7 350 = 31C6 0   570 = 56FB C   790 = 8189 2  1010 = 378A 7  1230 = 6E51 4  1450 = CA23 1  1670 = ED0F 5
  1 =    0 0  140 = F637 9 360 = 5B81 1   580 = B8D5 2   800 = E655 9  1020 = ED0F E  1240 = 3A55 8  1460 = D8FA 2  1680 =    0 5
  2 =    0 0  150 = 9D5F E 370 = 7A16 E   590 =  8F9 8   810 = ED0F 1  1030 =    0 E  1250 = 8BF8 D  1470 = 8FCB 9  1690 = 29CC D
  3 =    0 0  160 = 88C6 8 380 = 53CE 0   600 = D636 8   820 =    0 1  1040 = E7C9 6  1260 = ED0F 3  1480 = 2C83 E  1700 = B052 F
 10 = F916 6  170 = 6F81 B 390 =    0 0   610 = ED0F A   830 = 77D0 1  1050 = 417E 9  1270 =    0 3  1490 = ED0F 1  1710 = ED0F 0
 20 = BADE 9  180 = C8B9 6 400 = 363B 2   620 =    0 A   840 =  A3C C  1060 = D819 9  1280 = 344C 9  1500 =    0 1  1720 =    0 0
 30 = DA59 B  190 = D159 2 410 = 9F17 3   630 = 47B3 3   850 = 12FD 5  1070 = 9F6E 8  1290 = 4D56 1  1510 = EAEA 1  1730 = 4AF7 E
 40 = C0BD 7  200 = 6343 6 420 = EFDE 3   640 = A01D 7   860 = 8A44 7  1080 = 33B2 7  1300 = 185B A  1520 = 1C49 D  1740 = 6E8F 9
 50 = F716 E  210 = C3CB C 430 = 667A 6   650 = 2FB7 8   870 =  739 C  1090 = ED0F F  1310 = 3ECC A  1530 = DE1C E  1750 = ED0F 0
 60 = D7B6 C  220 = 5359 B 440 = F364 1   660 = 3048 D   880 = FE27 B  1100 =    0 F  1320 = 57E1 6  1540 = 939C A  1760 = 23EF C
 70 = 561D E  230 =  99E 7 450 =  28B 4   670 = 1AE5 8   890 = 44AB 8  1110 = F5B9 D  1330 = C18C 3  1550 = 2C83 C  1770 = 1F30 5
 80 = 9D63 9  240 = 1187 B 460 = 97B3 0   680 = 6B58 6   900 =  28B 2  1120 = DD2D D  1340 = 12B6 5  1560 = ED0F 3  1780 = 6E17 E
 90 = F151 B  250 = E888 6 470 =  DBA 5   690 = 5ECA 0   910 = 512E 9  1130 = 4F29 C  1350 = 3A07 6  1570 =    0 3
100 = BFBA 5  260 = 80BC 6 480 = 7DA2 F   700 = F364 B   920 = 381B 7  1140 = 6D59 7  1360 = 5114 0  1580 = A38F 3
110 = DEBB 7  270 = 5D2C C 490 = DF57 2   710 = 712E 3   930 = ED0F A  1150 = 7819 6  1370 = B4B8 7  1590 = 667A 2
```

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Euclid
is the most widely used 3D graphics system for the Archimedes.
It allows you to design and model any set of objects quickly using tools which are similar to those in Draw.

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control by
Mogul
gives the most widely used 3D animation system.
Films can be planned using a spreadsheet indicating just the key positions of moving objects including cameras.

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Archimedes Only

Rhapsody II (Archimedes Only)

A score writing program which has been designed to allow you to create and edit your own musical scores. You can enter your music by hand one note at a time, drag the notes on to the stave or you can even use a Midi instrument to capture music in real or step time.

All NEW Version
RHAPSODY
midi
£50.00

If you have a Midi instrument attached to your Archimedes you can play a part and then transcribe it on to a stave. This can be repeated and each part entered via the Midi keyboard and transcibed on to the appropriate stave. And of course you can play your score back through the Midi Keyboard.

The package features automatic beaming, up to 24 staves, changes of tempo and volume, ties, triplets, user defined trills and so on.

When your masterpiece is complete you could print the whole score or individual parts in the usual way.

Archimedes Game Maker's Manual

£14.95
Archimedes Game Maker's Manual
Terry Blunt

Now you can find out how to use your Archimedes and Basic 5 to build high quality games whether for education or for recreation. Ideal for the experienced or novice Basic programmer, Terry Blunt takes you through the seven major aspects to writing a successful and professional product: Planning a game; Critical games stages; Graphics and animation; Arcade games; Role playing games; Strategy games; Professional tips and tricks. You can see the principles laid out in fully tested listings. This book is sure to become an essential reference written in an informative and easy to read style. If you want to know how to use the Arc's graphics capabilities and sprites to full advantage and make better games, buy this book now. It's the only one you'll ever need - quote from *Micro User August issue.*

Toolkit +

Toolkit + is an improved version of the original Toolkit. Enhanced features include:

- 10 Fast memory and disc editors
- 8 Fast memory and disc searchers
- Fast scrolling disassembler
- Memory shift, swap and compuare plus AGET & APUT disc sectors
- FASTLOAD & FASTSAVE of screens
- A Series of commands to investigate SWI calls filetypes, files between specific dates or a combination of these parameters.
- Archiving so that you can back-up on your Hard Disc onto floppies, matching specific criteria.

It handles files larger files larger than 800k and is designed to cope with disc faults on both Hard Discs and floppies. Even if you lose one of your back-up discs you can still restore everything else, and of course the archived files can be restored at a later date.

£39.95

MIDI Expansion Card

Recommended for use with our music notation package Rhapsody II. By simply plugging in the midi interface it allows the user to connect a MIDI keyboard to the computer. You can then play a tune direct from the keyboard and capture the musical notes in Rhapsody. The music can then be transcribed ready for editing, replaying etc. With your score in memory you can replay it via MIDI, assigning the data to the MIDI channels available on your keyboard. Allowing the user to replay their masterpiece in full!

Price £45.00 (for A3000 machines) £65.00 (for 300/400 machines)

SPECIAL OFFER
Buy Rhapsody II & Midi Expansion Card for
£90.00 (A3000 machines) or £110.00 (for 300/400 machines)

DESKTOP OFFICE

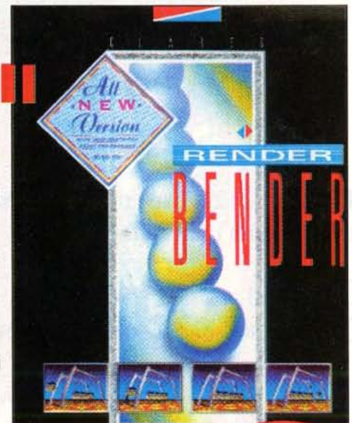
for the Archimedes

DESKTOP OFFICE

At last – a fully integrated suite of database, word processor, spreadsheet, charts and communications for the Archimedes. The database is simple to set up with a flexible card layout enabling you to design cards to suit your data. Video style controls make it easy to browse through the records. With instant search on a key field, sort routines and reports available on any combination of fields, DTOBase gives you true power and flexibility while remaining simple to use.

Special Offer: £79.95

Render Bender II



Render Bender II is another top rated graphics package from Clares. It is a powerful ray tracing package which consists of four applications:

Illuminator - a graphical front end to Render Bender which enables you to create Render Bender files using a graphics program similar to Draw.

Render Bender - the Ray Tracing part of the package. It takes a file from Illuminator and generates a ray traced image.

Animator - takes a sequence of screens and delta compresses them to produce an animated sequence.

Converter - converts compressed screens into sprite files and enables you to extract individual screens from an animation file.

BBC & Archimedes

THE PERFECT PAIR

The best-selling, award-winning BBC software is now joined by THE definitive guide

The Program

Mini Office II is the highly-acclaimed suite of integrated programs which turn your computer into a versatile business machine.

It's the perfect package to increase your personal productivity – with more than 400,000 satisfied users across the complete Mini Office range.

The Book

The Dabhand Guide to Mini Office II is a brand new book to help you get the most out of the software. It not only contains the facts, but also the kinds of hints and tips that can only be built up through years of computer use.

More than a manual, the guide assumes nothing. Beginning with the first sentences typed into the editor, you are led through all aspects of using the system, up to the most advanced techniques.

All the examples are also on an accompanying disc which even includes a very useful routine to print out large spreadsheets sideways.

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Model B, B+ 80T Disc	£29.95
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Master (5.25" 80T Disc)	£32.95

A Dabhand Guide
Mini Office II
DABS PRESS

The price includes the Mini Office Software, the book, A Dabhand Guide to Mini Office II, and an example disc.

Two educational adventure games from Selective Software

ADVENTURE
Teacher's Manual

For the BBC and Archimedes range of computers

Prices

Selective Software
Shylock Gnomes

Little Red Riding Hood

BBC	£10.95
Archimedes	£15.95

Shylock Gnomes

BBC	£17.99
Archimedes	£19.95

Take a step into the world of professional publishing with

DTP

This is an easy-to-use and flexible page design system for producing high-quality printouts through your Epson compatible printer. It comes with four of its own fonts to get you started plus a Font Designer to keep you going.

- Independent control of bold, italic, 'thin' and underline characteristics of the system font
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- Stretching and compressing of any area
- Pixel editing via zoom facility
- A5 page design
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- Four fonts provided
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- Built-in Graphic designer
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Europress Publications' DTP

5.25in DFS 40/80 track disc (only) £14.95

Due to the complexity of the program the fill routines will not function correctly with the B+, Master or Compact – all other features are compatible

£8.95

This unique package makes practising spelling loads of fun. Suitable for children from 5-15, Spell allows the user to learn at his or her own pace. It includes five different tests, each making use of more than 5,000 words – so much variety that you'll never get bored.

Count!

Five fun games to challenge all ages – and all abilities

What the package contains

- **In a Flash:** Calculate the sum as it appears on screen, then type in the correct answer. A progress chart will let you see how you are doing.
- **Rocket:** Hangman with numbers. Guess the calculations or use your knowledge and logic to launch the rocket or see it end up as a pile of scrap.
- **Lunar Buggy:** Improve the speed of your mental arithmetic by solving the poser before the buggy dives off the precipice.
- **All Mixed Up:** You are presented with sums that do not make sense. But by juggling the numbers you can get the right answer.
- **Conveyer Belt:** As you progress more and more calculations appear on screen. Not only do you have to solve the questions, but also remember the answers. It's a challenge which at its highest level will test even the best.

ONLY £8.95 *... for the Archimedes/Master Compact/Electron (3.5in disc) or BBC B/B+/Master (5.25in 40t or 80t disc)*

THE MICRO USER

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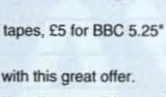

TAPE AND DISC BUNDLES

– the very best of ***The Micro User*** for as little as £3 for tapes, £5 for BBC 5.25" discs and £6 for BBC 3.5" and Archimedes 3.5" discs.

Catch up on many of the superb programs you missed with this great offer.

For a limited period we are offering five selected Micro User Tapes or Discs, all between 6 months and 2 years old.

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We've brought together some of the most popular compilations ever to have appeared in *The Micro User* for this special offer. For a limited period, we are offering them on four BBC 5.25"discs for the give-away price of £14.95!

TEN of the BEST!

Games

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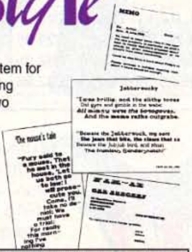

Fontstyle is a versatile system for creating professional looking printouts. It comes with two ready-made fonts and a designer so you can create your own. It's easy to use - just type in your text using your favourite word processor – enter the easy-to-remember formatting codes and save it. Then just load in the FontStyle program and you'll have superb results within minutes.

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Set of 64 Fonts (4 discs)	
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Arcade Game Creator is a suite of programs that let you into writing fast-action arcade games for Electron and BBC micros. Inclusive of a number of utilities to make design and programming easier and complete with manual, its costs £6.95 on tape or £9.95 on 40t/80t disc.

Bookcase

Desktop Publishing on the Archimedes

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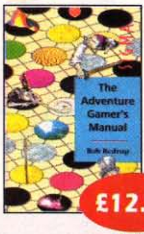

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Binder

THE MICRO USER

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THE MICRO USER

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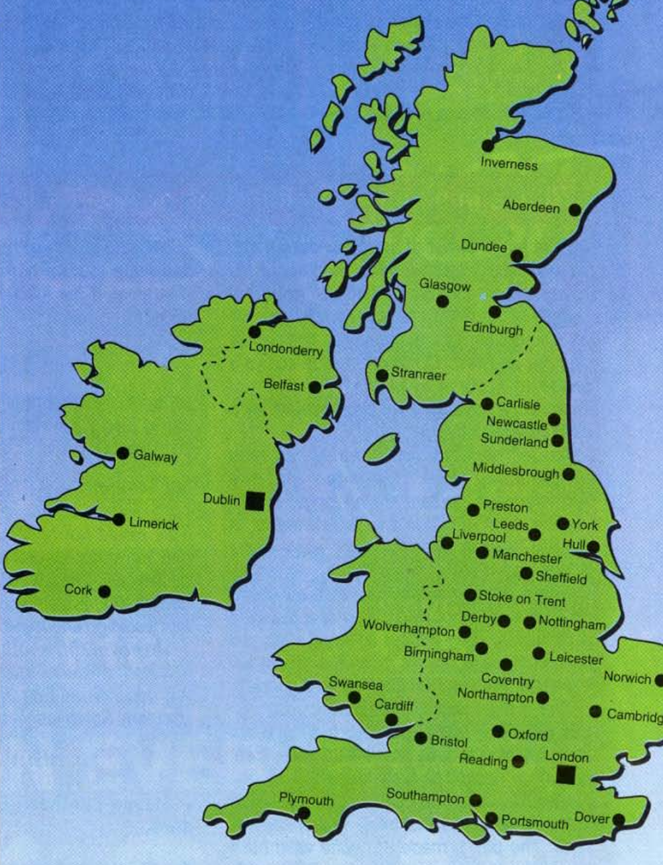
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Support for A3000?

I AM the owner of an A3000 which has been upgraded to 2Mb. I also have an extra double disc drive to run with it. I am very interested to learn as much as I can about running my computer to its full potential and would very much like to see some software on display before I buy it.

Unfortunately, I cannot find anywhere in the area that sells Acorn computers and software. Can you help?

My other query is why are all Acorn Open Days held so far away from Cornwall? It's time someone gave us a chance to see for ourselves what is on offer. I am sure that there are enough Acorn users to warrant an open day in this area. Please, please let's see something closer to our home. – **Mrs M. G. Bishop, Helston, Cornwall.**

● As Cornwall is the stomping ground for the Mad Hatter we certainly agree with you and Acorn actually had an open day recently in St Austell.

Or you could pop over the border into Devon to see Minerva Computers in Exeter (0392 410137), RGP Micro Systems in Plymouth (0752 346669) or West Devon Electronics in Yelverton (0822 853434). Minerva have regular Open Days and are actually planning a large Open Day/Exhibition later this year. Watch the News pages for more details.

Your nearest Acorn dealer is Microtest, 18 Normandy Way, Bodmin, Cornwall. Tel: 0208 73171.

Great sounds

GOING on holiday recently I decided to buy some additional speakers that could plug into my Walkman. I tried several low cost pairs and eventually decided on Ross, £14.99 from Argos. The speakers are a two-way system which are either battery or mains operated – a mains transformer comes included in the price.

They sat on my desk for a few days before I had the idea of plugging them into my A3000. All I can say is WOW the sound reproduction was superb, far superior to the internal speakers and without the hassle of trying to connect them up to my hi-fi with long trailing wires.

If you want exciting sound reproduction and good quality, smart-looking speakers, give them a try, you won't be disappointed. – **David Edwards, Taunton, Somerset.**

Rodent friendly

I HAVE found an interesting feature on the A5000: If the pointer is over a menu item with an arrow leading to a sub-menu and the menu button is pressed very slightly the sub-menu appears as if the pointer has been moved to the right.

This doesn't happen if the menu button is fully pressed and it doesn't happen with my A3000. I have tried find out if this returns a value using Mouse X, Y, Z but no value is returned. I wondered if this feature is meant to be built in as some kind of fourth function button or if it is some kind of hardware bug – though I would have thought this unlikely. I would be grateful for any comments. – **Oliver Clark, Redland, Bristol.**

● Actually you don't need to press the mouse button at all – there's no halfway position. If, on the A5000, you stop for a moment over a menu option that has a sub-menu then after a pre-determined delay the sub-menu is opened automatically – Acorn copying Apple again. You can turn this off and on using the Configure utility supplied on the rom.

Memory or storage

I HAVE an A3000 with 1Mb which seems no problem apart from the memory. I also bought the internal RTFM Joystick interface. Since I have no technical knowledge I want to know how I can get another 1Mb or hard disc.

I think all the memory upgrades are internal so I'm not sure if I can upgrade the ram. If it isn't then I'd like to add a hard drive but external ones are much more expensive than internal ones. Also I don't understand the difference

What's in a name: Archimedes or Acorn?

PRIZE letter

AS the proud owner of an Archimedes 310, I have recently become concerned about the future of this machine. With the apparent demise of the 400/1 series will hardware such as IDE drives, ram expansions, compatible podules and Risc OS 2 compatible software cease to become available? They do not seem to be advertised by large dealers such as Watford Electronics

Incidentally, if the 400/1 series has been discontinued does this mean that the Archimedes computers are no longer in production – the A3000 is always referred to as the BBC A3000. Does the same apply to the A5000 and A540?

I have heard that the roms from an A5000 do apparently work when fitted in a standard Archimedes, even without an Arm3. Can you confirm this and does it mean that Acorn will eventually release Risc OS 3 as an upgrade?

I have been watching the news pages with interest since last November but have not seen anything about a possible upgrade. If so, how much would it be likely to cost?

I would also like to comment on the article in the June issue about badly written applications. The points made are quite valid but I would like to draw your attention to an additional problem.

When starting an application from within another using SWI Wimp_StartTask *or in a !Boot file, the Run command is vital. Without it the filing system name seems to get lost. Therefore, if the following line was used in a !Boot file:*

```
adfs::Disc.$.!Edit
```

to run the !Edit application on the ADFS disc called Disc *the system variable containing the path would contain:*

```
:Disc.$.!Edit
```

This would not become apparent until Edit needed to access a file in its directory, such as the Task Window module. Even then, if the default filing system was still ADFS, the problem would go unnoticed.

However, if another filing system is selected, a file not found *– or similar – error will occur when Edit tries to access its own directory. So it's safest to use:*

```
Run adfs::Disc.$.!Edit
```

– **Steven Flintham, Skegness, Lincolnshire.**

● That's a good point about the Wimp_StartTask command – it's one of those features we come to know and love.

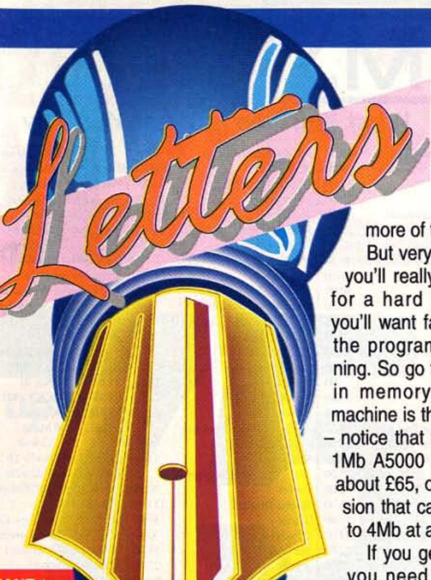
Risc OS 3 does automatically configure itself to run on the earlier machines and with the release of 3.10 – which corrects numerous features of the original version – it is now ready for general release.

Acorn will be making it available as an upgrade but they haven't given a date yet. The 300 series machines will need an expansion board because the Risc OS 3 rom chips have more pins than the Risc OS 2 ones. Acorn will probably leave these upgrades to third-party suppliers.

Hopefully the price will be kept down for the upgrade, just as the upgrade from the original Arthur OS to Risc OS 2 was kept to just under £30. However a price of £50 seems more realistic in this case as Risc OS 2 will continue to be supported. Having said that, Acorn have not been noted for sensible pricing in the past.

What's in a name, well quite a lot really. You're right, the Archimedes machines – the 300 and 400 series – are no longer in production. Risc OS 3 uses an Acorn symbol for the Task Manager on the right of the iconbar.

However a recent newsletter from Acorn indicated that using the word Archimedes as a catch-all for the 32-bit machines is acceptable. On the other hand new owners generally won't know what an Archimedes is.



WANT to write to The Micro User? The address is:

Letters, The Micro User, Europa House, Adlington Park, Macclesfield SK104NP.

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between IDE and SCSI – which should I go for if a 1Mb upgrade isn't possible?

I am on a very tight budget so I need the cheapest option and only a low capacity drive. Does the hard disc increase the memory available or does it just mean more storage space? If I bought a hard disc would I be able to run programs such as the Ice Cream demo? – **Greg Thomas, Bridgewater, Somerset.**

● All memory upgrades are internal and involve simple plug-in tasks – although if you do it yourself you will void your guarantee. Some hard discs are internal and have the same effect on your guarantee.

The choice between extra memory and a hard disc is very difficult, ideally you want both – of course. On balance extra memory is probably better first because you'll be able to run bigger and better programs – like !IceCream – or more of them.

But very soon after that you'll really feel the need for a hard disc because you'll want faster access to the programs you're running. So go for the upgrade in memory first, a 2Mb machine is the sensible size – notice that you can't get a 1Mb A5000 or A4. It'll cost about £65, or £75 for a version that can be upgraded to 4Mb at a later date.

If you get a SCSI drive you need a SCSI interface to go with it, so it uses up your expansion socket, although with SCSI you can, theoretically, plug in lots of other pieces of hardware. With the A3000 my preference is definitely an internal IDE, a 20Mb one will cost about £450.

Get the know-how

ON LAST month's subscription disc there is a program called Ice Cream which contains a large number of programs. Having double-clicked on the icon in the directory viewer an icon installed itself on the iconbar.

I opened the directory and attempted to run several of the programs but to no avail – I was continually rewarded with No run action for this file type.

Do I need to configure my machine in some way? Some of the files were listed as Basic but I still had no joy. Even from the command line it was impossible to find the way through the adfs path to the file/program I wanted.

The ReadMe file warned of the need for 2Mb of ram and MEMC1a chip – I have an A420/1 with 4Mb but I have no idea what MEMC I have. Perhaps you could throw some light on this?

Could you also tell me if it is possible to decompress the files on the monthly disc so that they can be saved in uncompressed format on a floppy so that any Basic programs can be listed and run without the hassle of trying and failing to unravel the filing system. As far as programming goes I think that I must be a non-starter.

This problem apart there seems to be a singular lack of type-in programs in the mag these days while they used to be quite plentiful in pre-Archimedes days. Where are they now?

I realise that the Archimedes machines are more complex than the BBC and Master series but a lot of good programs were written in Basic then. Now we have Basic V which is supposedly even more powerful – what's gone wrong? – **W. Cummins, Chingford, London.**

● To run the Ice Cream programs you click on the iconbar icon – you do have a MEMC1a chip if you have an A420/1.

I'm really not sure what your problem is with Basic programs and filing systems, all the programs can be extracted from the archives just by dragging them, just as you'd copy any other program from disc to disc.

As far as listings are concerned you've really answered your own question, you certainly can do more with Basic V, but it takes a lot more space.

Master emulator needed for A3000

WE HAVE about 80 BBC Master 128 computers in our school. We are now starting to buy A3000s. Some of the software we have will run under emulation using the !65Host.

Software written for the Master will not run under this emulator. There must be hundreds of schools who would like to be able to emulate a Master on a A3000. Do you know where we can get hold of one? Acorn do not make one and I don't know of a company that does. – **John Page, Solihull, Birmingham.**

● There is no Master emulator and I doubt there will be one, but we certainly agree that one would be very useful – and probably quite profitable. Any takers?

Educating Archie

I WILL soon be starting my music GCSEs and wonder if you could give me any advice on music software/hardware available for a 1Mb A3000. I have seen various adverts in your magazine for Rhapsody II, Notate and so on but I am unsure which is best.

I would like to know what I need to use a Yamaha PSS480 Midi keyboard to make use of a program's Midi facility. To print our scores I'd be using a Star LC-200 dot matrix printer. Can I use the printer driver on the Applications discs?

I have been having a problem with this printer as it prints a line of code at the top of the first page them moves on to the next sheet or it prints everything on the first centimetre of the page. – **Toby Garfath, London.**

Ian Waugh replies: Best is a very relative term because it depends on what exactly you want from the program. Both Notate and Rhapsody have their pros and cons, Rhapsody has more features and is probably the better choice for pure music creation. The February 1992 issue of *The Micro User* contains a review of Notate and a comparison of features with Rhapsody 2.

The emulations specs for the Star LC-200 claim it is full industry standard compatible which I take to mean it supports the Epson FX and LQ emulations. Selecting these in the !PrinterDM printer driver applications should work.

Your current printing problem is most likely caused by incorrect line feed/page feed settings which are used to move the paper on after printing a line or page. Most printers let you alter these from the front panel or with a set of DIP switches.

If it is a fault of the feed setting on the printer you'll probably have problems printing text too. Did your print your letter on the LC-200?

Some software lets you alter these settings, so if text prints OK you may need to look at the setting in the graphics software or explore both options.

ALL programs printed in this magazine are exact reproductions of listings taken from running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur, corrections are published as a matter of urgency.

Should you encounter error messages when you type in the program, they will almost certainly be the result of your own typing mistakes.

Unfortunately we cannot answer personal programming queries concerning mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in these pages.

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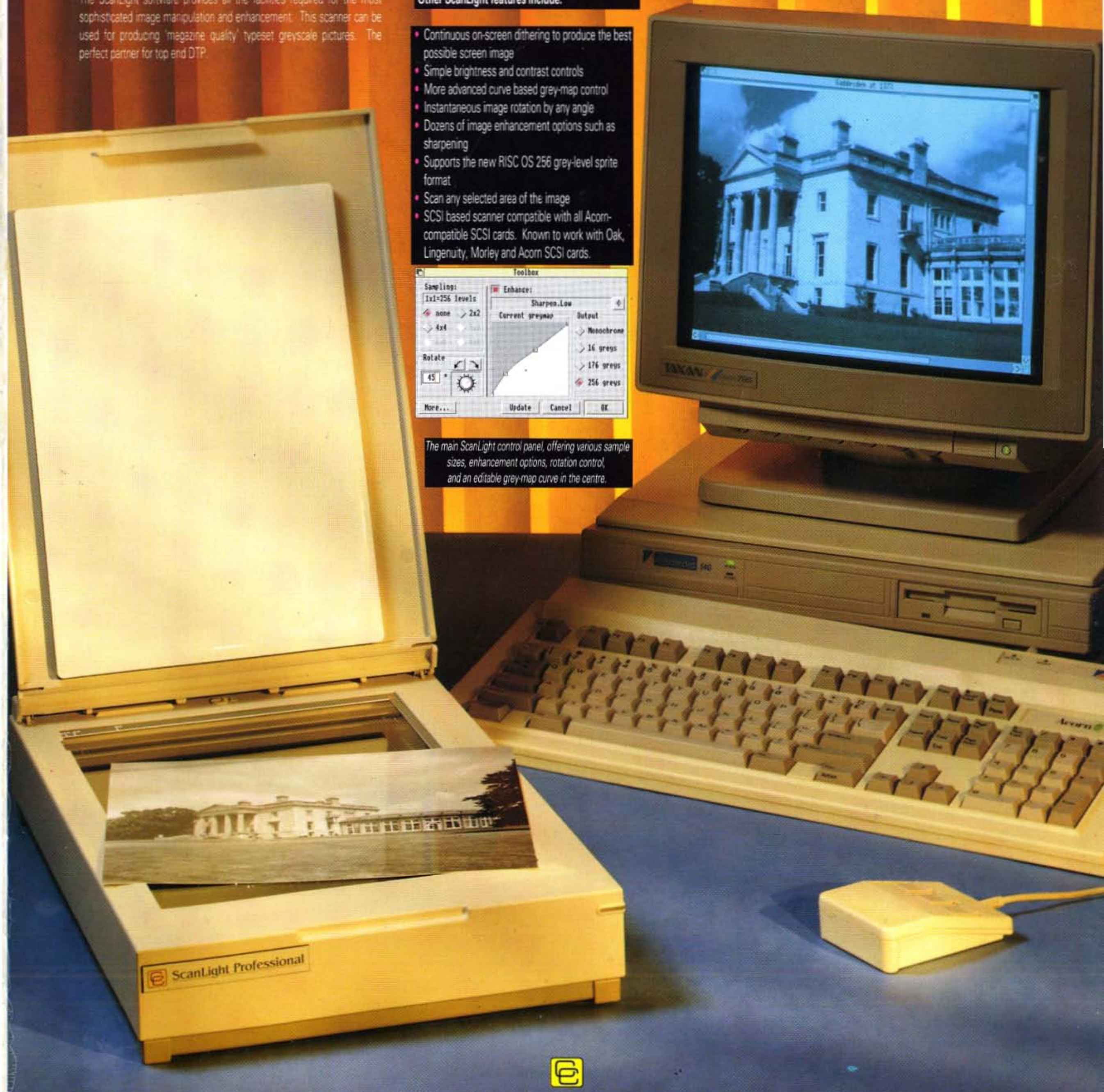
A new version of the ScanLight Professional, offering improved software, a new, more compact scanner, higher resolutions and a greatly reduced price.

ScanLight Professional is our top of the range flatbed greyscale scanner. It offers up to 600 dpi, A4, 256 grey-level scanning (1200 dpi 16 grey-levels and monochrome) in a device that is not much larger than a sheet of A4. The ScanLight software provides all the facilities required for the most sophisticated image manipulation and enhancement. This scanner can be used for producing 'magazine quality' typeset greyscale pictures. The perfect partner for top end DTP.

The ScanLight range of scanners offers several unique advantages over alternatives. All image manipulation and enhancement can be performed directly on the original scanned image data. It does not need to make more copies of the image, and since 256 grey-level images can be very large indeed this can make the difference between being able to scan what you require and not.

Other ScanLight features include:

- Continuous on-screen dithering to produce the best possible screen image
- Simple brightness and contrast controls
- More advanced curve based grey-map control
- Instantaneous image rotation by any angle
- Dozens of image enhancement options such as sharpening
- Supports the new RISC OS 256 grey-level sprite format
- Scan any selected area of the image
- SCSI based scanner compatible with all Acorn-compatible SCSI cards. Known to work with Oak, Lingenuity, Morley and Acorn SCSI cards.



Sampling: 1x1=256 levels
● none ◇ 2x2 ◇ 4x4
Rotate 45 °
☑ Enhance: Sharpen.Low
Current greymap
Output: ◇ Monochrome ◇ 16 greys ◇ 176 greys ● 256 greys

The main ScanLight control panel, offering various sample sizes, enhancement options, rotation control, and an editable grey-map curve in the centre.

Computer Concepts Ltd

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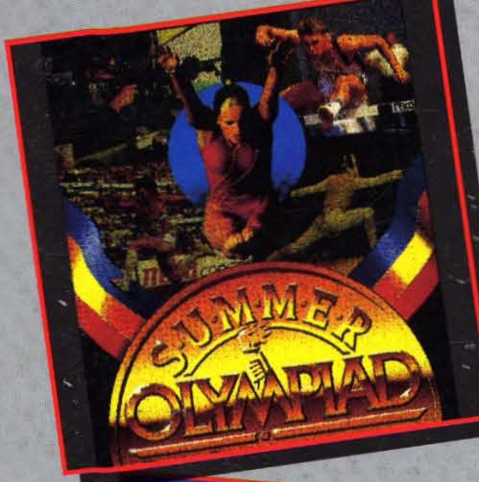
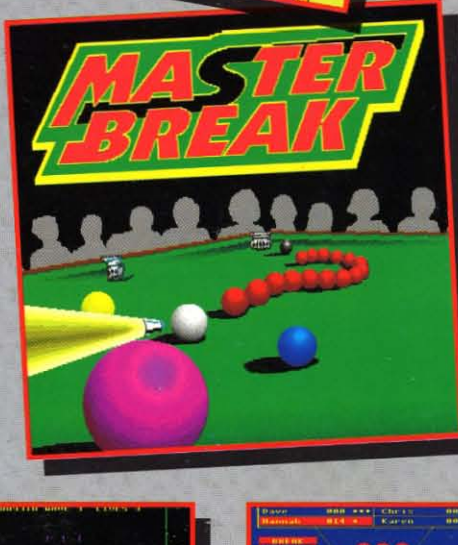
PLAY IT AGAIN SAM 17



VIDEO'S
REVENGE



Summer Olympiad

Capture the thrill and competitive spirit in five challenging events: Hurdles, Fencing, Skeet Shooting, Triple Jump and High Diving. The best ever Olympic simulation by *Tynesoft*. For one to four players.

Tactic

The widely praised and extremely addictive Archimedes strategy game from *Eterna* is now available for the first time for the BBC Micro/ Master. One or two player option. Master enhanced version.

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Blue Ball on Science
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Germany
Britain
Holland

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Snooker -style trivia quiz game for 1-4 players. Over 1500 questions on Science & Nature, Sport, Pop Music, Geography, etc. All the fun of a trivia quiz and snooker match rolled into one enthralling game.

This superb new 4-game compilation is only available on disc for BBC Micro (B, B+) and Master computers.

BBC Micro/Master 5¼" disc ... £14.95 (inc VAT) **Master Compact 3½" disc ... £19.95** (inc VAT)

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